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The College of Agriculture

1908-1909

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THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minnesota



UNIVERSITY
OF
MINNESOTA
MINNEAPOLIS

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SCALE OF FEET

CALENDAR FOR 1908-1909

1908

1909

MAY

S.	M.	T.	W.	T.	F.	S.
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JANUARY

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FEBRUARY

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MARCH

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JUNE

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University Calendar

1907-1908

THE UNIVERSITY YEAR

The University year covers a period of thirty-eight weeks beginning on the second Tuesday in September. Commencement day is always the second Thursday in June.

FEBRUARY	4 T	Second semester begins—classes called for regular work
	12 W	Lincoln's birthday—legal holiday
	22 S	Washington's birthday—legal holiday
APRIL	17 F	Good Friday. Recess two days
MAY	2 Th	Regular meeting Board of Regents
	25 M	Senior examinations begin
	30 S	Decoration Day—legal holiday
JUNE	1 M	Semester examinations begin
	6 S	Semester examinations close

COMMENCEMENT WEEK, 1908

SUNDAY	June 7	Baccalaureate service
MONDAY	June 8	Senior class exercises
TUESDAY	June 9	Phi Beta Kappa address. Senior promenade
WEDNESDAY	June 10	Alumni Day. Regular meeting Board of Regents
THURSDAY	June 11	Commencement Day. The thirty-sixth annual commencement
FRIDAY	June 12	Summer vacation begins

1908-1909

SEPTEMBER	7-14	Entrance examinations, condition examinations and registration
	15 T	Classes called for regular work. Seventeenth annual session
OCTOBER	1 Th	Regular meeting Board of Regents
	5 M	Regular meeting University Council. Opening day, School of Agriculture
NOVEMBER	26 Th	Thanksgiving Day. Recess three days
DECEMBER	7 M	Regular meeting University Council
	8 T	Annual meeting Board of Regents
	19 S	Holiday recess begins (no classes)
JANUARY	5 T	Work resumed in all departments
	23 S	Semester examinations begin
	30 S	Semester examinations close
FEBRUARY	2 T	Second semester begins—classes called for regular work
	12 F	Lincoln's birthday—legal holiday
	22 M	Washington's birthday—legal holiday
APRIL	5 M	Regular meeting University Council
	9 F	Good Friday. Recess two days

MAY	6 Th	Regular meeting Board of Regents
	24 M	Senior examinations begin
	31 M	Decoration Day—legal holiday
JUNE	1 T	Semester examinations begin
	5 S	Semester examinations close
	7 M	Regular meeting University Council

COMMENCEMENT WEEK, 1909

SUNDAY	June 6	Baccalaureate service
MONDAY	June 7	Senior class exercises
TUESDAY	June 8	Sigma Xi address. Senior promenade
WEDNESDAY	June 9	Alumni Day. Regular meeting Board of Regents
THURSDAY	June 10	Commencement Day. The thirty-seventh annual commencement
FRIDAY	June 11	Summer vacation begins

PROGRAM—ENTRANCE EXAMINATIONS

MONDAY,	September 7, 9	A. M.	3	Botany
			3	Zoology
			1	Astronomy
			3	Geology
			2 P. M.	2 American Government
TUESDAY,	September 8, 9	A. M.	2	Political Economy
			2	History
			5	Physics
			2 P. M.	4 Chemistry
			3	Physiography
WEDNESDAY,	September 9, 9	A. M.	1	English
			2 P. M.	1 German
			1	French
			1	Latin
			1	Scandinavian
THURSDAY,	September 10, 9	A. M.	1	Elementary Algebra
			2	Commercial Geography
			2 P. M.	1 Higher Algebra
FRIDAY,	September 11, 9	A. M.	1	Plane Geometry
			2 P. M.	1 Solid Geometry

1 Folwell Hall, 2 Library Building, 3 Pillsbury Hall, 4 Chemical Laboratory, 5 Physics Building, 6 Mechanic Arts Building.

The University

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges and departments:

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

The College of Agriculture

The School of Agriculture

Short Course for Farmers

The Dairy School

The Crookston School of Agriculture

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

The Regents of the University have entrusted to their charge:

THE EXPERIMENT STATIONS, including—

The Main Station at St. Anthony Park

The Sub-Station at Crookston

The Sub-Station at Grand Rapids

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

Bulletins of these schools, colleges and departments may be obtained upon application to the University Registrar.

The Board of Regents

CYRUS NORTHROP, LL. D., MINNEAPOLIS *Ex-Officio*
The President of the University

The HON. JOHN LIND, MINNEAPOLIS 1914
The President of the Board

The HON. JOHN A. JOHNSON, ST. PETER *Ex-Officio*
The Governor of the State

The HON. JOHN W. OLSEN, ALBERT LEA *Ex-Officio*
The State Superintendent of Public Instruction

The HON. THOMAS WILSON, ST. PAUL 1909

The HON. A. E. RICE, WILLMAR 1909

The HON. B. F. NELSON, MINNEAPOLIS 1910

The HON. PIERCE BUTLER, ST. PAUL 1910

The HON. CHARLES A. SMITH, MINNEAPOLIS 1910

The HON. S. M. OWEN, MINNEAPOLIS 1913

The HON. W. J. MAYO, ROCHESTER 1913

The HON. HENRY B. HOVLAND, DULUTH 1914

C. D. DECKER, MINNEAPOLIS
Secretary of the Board.

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL. D., *President*

ERNEST B. PIERCE, B. A., *Registrar*

JAMES T. GEROULD, B. A., *Librarian*

C. D. DECKER, *Purchasing Agent*

J. D. BREN, *Cashier*

THE COLLEGES

JOHN F. DOWNEY, M. A., C. E., *Dean of the College of Science, Literature, and the Arts*

FREDERICK S. JONES, M. A., *Dean of the College of Engineering and the Mechanic Arts*

EUGENE W. RANDALL, *Dean and Director of the Department of Agriculture*

WILLIAM S. PATTEE, LL. D., *Dean of the College of Law*

FRANK FAIRCHILD WESBROOK, M. A., M. D., C. M., *Dean of the College of Medicine and Surgery*

EUGENE L. MANN, B. A., M. D., *Dean of the College of Homeopathic Medicine and Surgery*

ALFRED OWRE, D. M. D., M. D., *Dean of the College of Dentistry*

FREDERICK J. WULLING, Phm.D., LL.M., *Dean of the College of Pharmacy*

WILLIAM R. APPLEBY, M. A., *Dean of the School of Mines*

GEORGE B. FRANKFORTER, Ph. D., *Dean of the School of Chemistry*

GEORGE F. JAMES, Ph. D., *Dean of the School of Education*

HENRY T. EDDY, C.E., Ph. D., LL. D., *Dean of the Graduate School*

ADA L. COMSTOCK, M. A., *Dean of Women*

The University Council

At the regular meeting of the Board of Regents of the University, May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be The University Council. It shall consist of the President of the University, the deans of the various colleges and schools, one elected representative from each college or school for each 400 students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen from the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee

The University press committee

The committee on athletics

The committee on University relations to other institutions of higher learning

The committee on health and sanitation

The committee on commencement and other University functions

The committee on catalogue, programs and courses of study

The committee on student entertainments and social affairs

And such other committees as the general University interests may require

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call

Representatives to the Council

The University

PRESIDENT CYRUS NORTHROP

The College of Science, Literature and the Arts

DEAN JOHN F. DOWNEY

PROFESSOR JOHN H. GRAY

PROFESSOR J. C. HUTCHINSON

PROFESSOR H. F. NACHTRIEB

PROFESSOR NORMAN WILDE

The College of Engineering and the Mechanic Arts

DEAN FREDERICK S. JONES

PROFESSOR GEORGE D. SHEPARDSON

The College and School of Agriculture

DEAN EUGENE W. RANDALL

PROFESSOR HARRY SNYDER

PROFESSOR SAMUEL B. GREEN

The College of Law

DEAN WILLIAM S. PATTEE

PROFESSOR HENRY J. FLETCHER

The College of Medicine and Surgery

DEAN F. F. WESBROOK

PROFESSOR THOMAS G. LEE

The College of Homeopathic Medicine and Surgery

DEAN EUGENE L. MANN

The College of Dentistry

DEAN ALFRED OWRE

The College of Pharmacy

DEAN FREDERICK JOHN WULLING

The School of Mines

DEAN WILLIAM R. APPLEBY

The School of Chemistry

DEAN GEORGE B. FRANKFORTER

The College of Education

DEAN GEORGE F. JAMES

The Graduate School

DEAN HENRY T. EDDY

General Alumni Association

DAVID P. JONES

The Dean of Women

ADA L. COMSTOCK

University Council Committees

The University Auditing Committee

PROFESSORS ANDERSON, FLETCHER, OWRE, SIGERFOOS, SPRINGER

The Committee on Athletics

PROFESSORS PAIGE, BROOKE, HARDING, D. P. JONES, LITZENBERG

The Committee on Grounds and Sanitation

PROFESSORS FLATHER, BASS, BRACKEN, HICKMAN, RANDALL, SIDENER,
WESBROOK

The Committee on Catalogue, Programs and Course of Study

DEANS APPLEBY, EDDY, FRANKFORTER, JAMES, JONES, MANN, OWRE,
WULLING; PROFESSORS FLETCHER, JOHNSTON, SCHLENKER, SNYDER,
E. B. PIERCE

The Press Committee

PROFESSORS SCHAPER, BAUER, CONSTANT, ERDMANN, JAMES

The Committee on Commencement and other University Functions

PROFESSORS NACHTRIEB, JENKS, OWRE, PATTEE, RANDALL, SCHLENKER,
WASHBURN

The Committee on Student Entertainments and Social Affairs

PROFESSORS FRANKFORTER, BASS, COMSTOCK, COOKE, MULLEN, PIKE

The Committee on University Relations to other Institutions of Higher Learning

PROFESSORS DOWNEY, BOTHNE, EDDY, GRAY, GREEN, JAMES, LEE

The Committee on University Extension and University Lectures

PROFESSORS WEST, HAECKER, RANKIN, SCHLENKER, SHEPARDSON

The Committee on the Library

PROFESSORS EDDY, FLETCHER, F. S. JONES, LEE, REYNOLDS,
VAN BARNEVELD, WEST

The College of Agriculture

FACULTY

CYRUS NORTHROP, LL. D., *President.*

E. W. RANDALL, *Dean.*

SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*

HARRY SNYDER, B. S., *Professor of Agricultural Chemistry and Soils.*

T. L. HAECKER, *Professor of Dairy Husbandry and Animal Nutrition*

M. H. REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*

ANDREW BOSS, *Professor of Agriculture and Animal Husbandry.*

FREDERICK WASHBURN, M. A., *Professor of Entomology*

WILLIAM BOSS, *Professor of Farm Structures and Farm Mechanics.*

E. M. FREEMAN, M. S., *Professor of Vegetable Pathology and Botany.*

JOHN STEWART, B.S., *Professor of Agricultural Engineering*

R. C. LANSING, M.A., *Professor of English*

D. D. MAYNE, *Principal of School of Agriculture*

JOHN A. HUMMEL, B. Agr., *Assistant Professor of Agricultural Chemistry.*

C. P. BULL, B. Agr., *Assistant Professor of Agriculture.*

D. A. GAUMNITZ, M. Agr., *Assistant Professor of Animal Husbandry.*

C. C. LIPP, D.V.M., *Assistant Professor of Veterinary Medicine and Surgery*

E. G. CHEYNEY, B. S., *Assistant Professor of Forestry.*

S. B. DETWILER, B. S., *Assistant Professor of Forestry.*

EDWARD SIGERFOOS, Ph.S., *Military Instruction*

INSTRUCTORS

J. A. VYE, *Farm Accounts.*

J. M. DREW, *Blacksmithing, Poultry.*

JUNIATA SHEPPERD, M. A., *Domestic Science.*

MARGARET BLAIR, *Domestic Art.*

FANNIE C. BOUTELLE, *Domestic Economics*

MARY BULL, *Domestic Science*

A. D. WILSON, B. Agr., *Agriculture.*

LE ROY CADY, B. S. A., *Horticulture*

- GRACE B. WHITRIDGE, *Physical Culture*
A. G. RUGGLES, M. A., *Entomology*.
E. C. PARKER, B. Agr., *Agriculture*.
L. B. BASSETT, *Agriculture*
A. M. BULL, *Drawing*
W. L. BEEBE, D. V. M., *Bacteriology*.
W. H. FRAZIER, B. S., *Agricultural Chemistry and Soils*
A. E. WILHOIT, M. A., *Agricultural Chemistry and Soils*
H. B. WHITE, B. S. A., *Farm Structures and Farm Mechanics*
JOSEPHINE CRAIG, *Agricultural Chemistry*
A. R. KOHLER, B. S. A., *Horticulture*
C. SCHROEDER, B. S., *Animal Husbandry*
HENRIETTA CLOPATH, *Drawing*
H. B. ROE, *Mathematics*
MARTHA B. MOORHEAD, M. D., *Lecturer in Domestic Hygiene*

General Information

REQUIREMENTS FOR ADMISSION TO ALL COURSES IN THE COLLEGE OF AGRICULTURE

Graduates of the School of Agriculture, who have completed the studies prescribed in the intermediate course or fourth year, and *graduates of approved high and normal schools*, as approved by the committee on entrance requirements and course of study, are admitted to the freshman class in the courses in the College of Agriculture; the former to Division "A," and the latter to Division "B."

Agricultural students taking courses in the College of Science, Literature, and the Arts, or in other colleges of the University, are required to conform to rules published in the bulletins of the respective colleges.

Students from other colleges and universities: Graduates from other colleges and universities may be admitted upon presentation of certificates, and will receive credit from the several professors for all work satisfactorily completed of similar character and grade to that given in this course.

Special Students: Graduates of the School of Agriculture may be admitted as special students and be allowed to pursue such studies in the course offered in the College of Agriculture as are approved by the faculty.

All students in the College of Agriculture must advise with the dean or the committee on college and graduate work concerning all electives. No student is allowed to enter any course until such course is properly entered upon the student's registration card by the registrar of the University, and no credit shall be given for subjects in which the student has not been previously registered.

REQUIREMENTS FOR GRADUATION AND DEGREES

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work equivalent to 144 credit hours (all the work required in the Freshman B year being counted as 35 credits), together with such practical experience as may be required by the committee on college course, students in the course in agriculture will be recommended for graduation with the degree of Bachelor of Science in Agriculture and students in the course in home economics with the degree of Bachelor of Science in Home Economics.

Students in the course in Forestry after completing the prescribed course of study, equivalent to 158 credit hours, will be recommended for graduation with the degree of Bachelor of Science in Forestry.

The elective studies designed as academic are to be chosen from the printed semester programs of work offered in the colleges of Science,

Literature and the Arts; Law; Medicine; and Engineering; no student to take more than two semesters in either of the three last named colleges. The elective studies designated as agricultural are to be chosen from the printed program of work offered in the College of Agriculture.

GRADUATE WORK

Special facilities are offered to graduate students from this and other agricultural colleges who wish to become familiar with methods employed in experiment station work, and to pursue their collegiate studies further. Courses for major and minor subjects may be arranged by consulting the professors in the different divisions. Students who enter for advanced degrees, register with the committee on registration of the College of Agriculture and also within the Graduate School. They must take their major subjects in the College of Agriculture, but they may take one or both of their two minor subjects in the College of Science, Literature and the Arts or in the College of Engineering and Mechanic Arts. Graduate students registered in the Graduate School may take one or both of their minor subjects in the College of Agriculture.

I. The degree of Master of Science in Agriculture will be conferred on a bachelor of this or any other agricultural college of equal grade who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall pass an examination in certain prescribed lines of study and present a satisfactory thesis in accordance with the requirements of the Graduate School.

II. All general regulations of the Graduate School governing candidates for the master's degree, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, apply to candidates for master's degrees in the College of Agriculture.

III. The degree of Doctor of Science will be conferred by the Graduate School for study in the College of Agriculture on bachelors of this or any other agricultural college of equal grade within not less than three years after graduation therefrom under conditions prescribed by the faculty of the graduate school.

FEEES

All students in the college, who are residents of the state of Minnesota, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

DAILY ROUTINE

The daily session is divided into eight recitation periods of fifty minutes each, four in the morning and four in the afternoon. The morning session begins at 8:15 and closes at 11:30 o'clock. A general assembly of the faculty and students is held at 11:30 o'clock. The noon hour extends from 12:15 to 1:15 o'clock. The afternoon session begins at 1:15 o'clock and continues until 4:30. With the exception of Saturday afternoon work extends through six days of the week.

ORGANIZATIONS

The Grange is comprised of the members of the faculty and others connected with the institution and interested in its welfare. Meetings are held on the first and third Monday evenings of each month. The order is intended to bring those connected with the College and Station in closer touch with one another and with the many lines of work carried on in the several divisions. Its further purpose is to keep in closer touch with the scientific world and the grange work of the state and nation.

Philonthian Literary Society is an organization of the students of the College of Agriculture, its object being to train its members in the art of public speaking, debating and parliamentary practice. The society meets once a week and presents a program including readings, recitations, debates, etc. The membership is limited to forty and is only for students in the College of Agriculture.

PUBLICATIONS

The Forestry Club was organized by the Forestry students for the promotion of good fellowship and mutual interests. The specific object of the club is to keep the members up to date on Forestry Literature and current affairs in the lumber world.

Forestry Publication.—The "Minnesota Forester" is the official organ of the Minnesota State Forestry Association. It is edited by the Forestry Department of the University and is devoted to the advancement of the forestry movement with special emphasis on farm forestry.

Farm Student's Review.—This is a paper published and managed by the Alumni Association of the School of Agriculture. It is the official organ of the Alumni Association and the Farmer's Club. The *Review* is intended to be a medium through which former students may keep in touch with the Agricultural School and with one another. It also endeavors to bring the farmers of the State into closer touch with the school, the college, and the Experiment Station. To this end, the paper strives to present the latest progress in the experimental work of the various stations and to call attention to the most practical farm practices.

ARMOUR SCHOLARSHIPS

Through the exhibits of live stock at the International Exposition in 1907, the College of Agriculture has been awarded two of the J. Ogden Armour scholarships. Each scholarship amounts to \$250.00 and is to be awarded to a worthy student in the Agricultural College. These scholarships will be available during the next college year.

LIBRARY

The library of the College of Agriculture contains between 10,000 and 11,000 carefully selected volumes and a large number of pamphlets, bulletins, and reports which are unbound.

Each department connected with the school and college aids in bringing together all valuable material, and students will find every inducement to pursue an extended reading course in connection with their class work. The library also contains a small but well selected number of the standard works in English and American literature, and is well provided with general reference books and general technical periodicals. The card catalogue of author and subject aids greatly in the use of the books which are all classified by the Dewey Decimal Classification. Those in charge are always pleased to assist students and aim to make the library a center for all agricultural research study.

COURSE IN AGRICULTURE

The course in agriculture is designed to give the student a broad education in the sciences and arts relating to agriculture and to fit him for the work of the agricultural specialist. The physical and biological sciences are made prominent. The work in these subjects is begun in the first or second year and may be continued throughout the course. For the first two years, the lines of study are prescribed, the subjects being chosen with a view of giving a good foundation for the work which follows. For the last two years, the work is mostly elective and gives the student an opportunity to take work along certain lines for which he has a special aptitude and liking.

In the College of Agriculture a portion of the work is taken in the College of Science, Literature, and the Arts. All academic electives and the prescribed work in geology, German, French, botany, zoology, psychology, English literature, economics and education are taken in the College of Science, Literature, and the Arts. The agricultural electives and the prescribed subjects not mentioned above are taken at University Farm.

The classes in the College of Agriculture begin with the opening of the regular University year (for which see calendar).

AGRICULTURE

Equipment. The equipment for instruction in agriculture consists of the following: Special laboratories and class rooms with modern apparatus for all courses, collections of classes and varieties of all field and weed seeds; herbariums of weeds and grasses indigenous to the state; a germinating room which affords opportunity for a study of the vitality and strength of seeds; charts and models of various details of crops together with bulletins on farm management, the cost of crop production, and other pertinent topics supplement the daily lectures; machinery used on University farm and generously loaned by the firms of the Twin Cities afford valuable subjects for instruction work. The fields and plots of the Experiment grounds offer additional "laboratories" and studies for use in class work. The student's home and farm is at all times made the basis of his particular study.

The State Grain Inspection department, elevators, mills and adjoining farms of the Twin Cities and vicinity furnish a study for the merchandizing of grains and the planning of farms. An agricultural museum, now being equipped, will contain much material that will be instructive and historic, and serve to show the close relations of agriculture and the modern industries.

Standard references upon agriculture are provided for an exhaustive study of any branch of this subject and original research is a prominent factor of the agricultural course.

AGRICULTURAL CHEMISTRY AND SOILS

Nature of Courses. All students are required to take courses 1 to 5 inclusive. Courses 7 and 8 are general lecture courses required in the agricultural course. These courses can be taken either with or without the laboratory courses, Nos. 9 and 10. Course 6 is required of all students before taking any of the more advanced laboratory work.

Equipment. A special laboratory with modern apparatus for the analysis of soils, foods and agricultural products is provided. The equipment contains an experiment mill for the production of wheat flour, a Berthelot-Atwater calorimeter for the determination of the caloric value of foods, vacuum ovens, apparatus for the chemical and physical analysis of soils, an electrical apparatus for determining the resistance of soils to soluble salts, and the necessary facilities for human and animal food investigations. Special facilities are offered in soil investigations and in the analysis and testing of wheat, flour and cereal products for commercial purposes. Nutrition investigations, including the digestibility of foods, the chemical changes which take place in cooking, and the losses in the

preparation of foods form a part of the Experiment Station work. This offers an opportunity for students to study methods of investigation relating to human food problems. Laboratory practice is also offered to advanced students in the study of household problems in which chemistry is involved. Special classes are also formed for the study of dietary problems. Standard reference books and journals, including *Jahresbericht der Agrikultur Chemie*, *Comptes Rendus*, *Biedermann's Centralblatt*, *Annales de la Science Agronomique* and *Veruschs-Stationen* are provided for the advanced work in agricultural chemistry.

Fees. In all of the laboratory courses in agricultural chemistry, a fee is charged to cover the cost of material used, and breakage. The student is assigned a certain amount of apparatus and material for which he gives a receipt, and deposits \$3 with the accountant before beginning work. All apparatus returned in good condition at the close of the term is credited to the student's account upon settlement.

ANIMAL HUSBANDRY

Equipment. Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm and herds of blooded stock near the institution and the annual show of live stock at the state fair serve for extended observation of breeds and methods of management. Each year a number of experiments are under way in the feeding of these classes of animals. Breeding experiments are also undertaken with sheep and swine, and theoretical experiments with the smaller animals. Experiments in summer feeding cattle, sheep and swine wholly or in part on pasture are carried on each year. The new live stock building affords excellent accommodations for class work in stock judging.

DAIRY HUSBANDRY

Equipment. Students in the college course have the advantages of the equipment of the dairy school. The feeding and breeding experiments in the dairy division of the experiment station serve a most useful purpose in the collegiate instruction. The cordial relations existing between the department of agriculture and the other state institutions are often advantageous to college students well advanced in dairy work.

Representatives of several breeds of cattle are kept for class use. Herds in the vicinity and those shown at the state fair are useful to students in this course.

ENTOMOLOGY

Equipment. Well lighted laboratories with modern equipment are at the disposal of college students for both undergraduate and graduate

work. Instruction is further aided by an excellent series of charts and lantern slides. The department is well equipped with museum specimens convenient to the lecture room, showing not only a large series of insects injurious and otherwise, but also over 10,000 specimens, birds and other animals which have a direct bearing upon agriculture. A good museum is also a valuable auxiliary in instruction and friends of the institution are urged to contribute specimens which illustrate the animal resources of the state. Excellent facilities for the installing and caring for museums are offered.

In economic work the student is brought into direct contact with spraying apparatus and insecticides. Practical work in bee keeping is offered in our apiary, and experiments in insect life can be carried on by advanced students in the insectary at nearly all seasons of the year.

FARM STRUCTURES AND FARM MECHANICS

Lectures and practicums in designing and construction of farm houses, farm barns, silos, out-buildings and conveniences; cement floors, walls, troughs; farm water systems, wells, cisterns, tanks, house heating and plumbing systems, and in painting farm buildings.

Equipment. Students taking this subject have the advantage of many practical examples in designing and construction of farm buildings.

The buildings on the campus, such as farm house, barns, dairy buildings, greenhouses, live stock pavilion, sheep barns, swine barns, silos, the water, sewer and heating systems are available for this work.

Many new residence buildings being erected in the vicinity of the campus afford excellent opportunities for special studies in modern house construction.

The aim is to fit the student to be able to design, estimate the cost of and construct such buildings as are best adapted to meet farm conditions.

HORTICULTURE

Equipment. The work in the division of horticulture is mainly carried on at University farm. About twenty acres is here used for the field work in this line. The horticulture building furnishes excellent facilities for classroom and laboratory exercises. The special work in breeding and testing fruits is carried on at Zumbra Heights, Carver county, where one hundred acres of land is devoted to this purpose and equipped with suitable greenhouse, storage cellar, barns, etc., affording excellent facilities for this line of investigation.

The campus of the School of Agriculture is planted out with a collection of trees, shrubs and herbaceous plants suitable for this section, the specimens of which are labeled with their common and botanical

names. The parks, greenhouses, orchards and nurseries of the near vicinity afford convenient and satisfactory illustrations of the best commercial methods and ornamental planting. Our facilities in this line are unexcelled perhaps by any other college in this country.

The greenhouses, laboratories and class rooms of the division of horticulture are well equipped with modern apparatus. The division library contains a large number of horticultural works and is further supplemented by a card index to all its literature.

VETERINARY MEDICINE AND SURGERY

Equipment. The veterinary building gives ample facilities for good work. The hospital furnishes cases for study and demonstration and the dissecting room affords material and opportunity for studying the digestive organs and locomotor apparatus. A large and well stocked museum contains ample material for illustration.

Instruction is given by text-books, lectures, collateral reading and by practice work. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of locomotion, conformation, the digestive organs, and the higher physiology of digestion are given prominence.

Infectious diseases of domestic animals are studied with reference to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses and methods of administration.

COURSE IN FORESTRY

The course in forestry is a four years course intended to prepare men to take charge of private forest properties, for the Government Service, or for positions as teachers. It leads to the degree of Bachelor of Science in Forestry.

Although a course leading to a technical degree in a specialized science, it is nevertheless based on broad enough lines to afford a good general scientific education. The forester in his lonely life in the woods is very frequently thrown largely upon his own resources and should be capable of obtaining pleasure and interest out of all his surroundings. For this reason an attempt is made to give the student in addition to a thorough training in technical forestry, a good working knowledge of all the sciences and other lines of study which touch upon his life in any way.

Special emphasis is laid on the value of field work and excursions. Every student is required before graduation to take four weeks work in some lumber camp, so as to become familiar with common lumbering operations. There will also be excursions to near-by forests, to lumber

camps, saw mills, wood manufacturing and paper mills; to the Boom Company's work on the Mississippi river; to near-by nurseries; and it is expected that arrangements will be made which will afford an opportunity for students to visit some of the forests of Montana, Idaho and Washington at a very low rate.

Equipment. The vast lumbering operations in the northern part of the state offer the best opportunities for a study of that branch. The establishment of the Chippewa Forest Reserve and its management by the Forest Service give opportunities which few other sections possess to study the best methods of forest management. The State has twenty-one thousand acres of timber to be used as a forest and game preserve, on which student help will be largely used. Itasca State Park, 22,000 acres in extent, is used by the Forestry School as a demonstration forest and experiment station. Every student spends about twelve months in the park during his course and does practical work in all branches. The use of this park gives the Minnesota Forestry School a forest equipment which is unsurpassed anywhere.

Throughout the year, special lectures will be given by the State Forestry Commissioner, the State Game Warden, the State Fish Commissioner and prominent lumbermen and lumber manufacturers of Minneapolis and St. Paul. This touch with the commercial side of the lumber business is very important and the situation of the school makes it possible to offer a great deal of it. Other special lectures will be presented as opportunity offers.

COURSE IN HOME ECONOMICS

The work in home economics offered in the College of Agriculture is a four years course leading to the Degree of Bachelor of Science in Home Economics and is open to graduates from the School of Agriculture who have taken the work of the intermediate year, and to graduates of approved high and normal schools. It is intended to bring to the vocation of home making the same kind of help which the course in agriculture brings to the business of farming. Aside from the universal need of education of this character, there is a marked and increasing demand for trained women to fill institutional positions and administrative positions as competent supervisors of supplies and of hygiene where large numbers are cared for in collective housekeeping, as well as for special teachers in the several divisions of home economics.

NORMAL COURSE

In addition a short two years normal course is offered in home economics, which includes all the special technical subjects given in the four years

course in the College of Agriculture at the University Farm, but does not include the required general cultural studies which are given in the College of Science, Literature, and the Arts. Those who complete this course receive a certificate only.

Graduates of other reputable colleges can here secure a Bachelor's degree by devoting two years to the subject of Home Economics. The major work must be done in Home Economics and one or both of two minors must be completed under the advice of the college committee in one of the other divisions of the College of Agriculture, or in the College of Science, Literature, and the Arts. When approved by the dean and college committee, other subjects given in these colleges may be substituted for the prescribed subjects in the course in home economics.

Women who are sufficiently advanced may study music or art during the junior or senior years, provided that no student may receive more than two semesters' credit in music and art together.

OUTLINE OF COURSE IN AGRICULTURE

(Numbers after subjects indicate number of courses)

FRESHMAN YEAR

Division A.

For graduates of the School of Agriculture

First Semester

Mathematics 1, three hours, Mr. Roe
Geology 1, three hours, Professor Hall
German 1, five hours, Professor Schlenker and Assistants
Rhetoric 1, three hours, Professor Lansing
Botany 1, six hours, Professor Clements and Assistants

Second Semester

Mathematics 3, half semester, three hours, Mr. Roe
Drawing 2, half semester, four hours, Miss Clopath
German 1, five hours, Professor Schlenker and Assistants
Rhetoric 1, three hours, Professor Lansing
Botany 1, six hours, Professor Clements and Assistants
Agricultural Chemistry 4, six hours, Mr. Wilhoit

FRESHMAN YEAR

Division B

For graduates of approved High Schools or others of equal standing.

First Semester

Rhetoric 1, three hours, Professor Lansing
Farm Mechanics 1, four hours, Professor Wm. Boss and Assistants
Agricultural Chemistry 1, five hours, Professor Snyder and Assistants
Animal Husbandry 1, three hours, Mr. Schroeder
Entomology 1, half semester, three hours, Professor Washburn
Horticulture 1, two hours, Mr. Cady
Agriculture 2, half semester, three hours, Mr. Parker
Drawing 1, four hours, Mr. A. Bull
Veterinary 1, three hours, Professor Reynolds
Agriculture 1, three hours, Assistant Professor Bull
Military Drill, three hours, Captain Sigerfoos, U. S. A.
Gymnasium, one hour

Second Semester

Animal Husbandry 3, three hours, Professor A. Boss
Farm Mechanics 2, four hours, Mr. Drew
Agricultural Chemistry 2, three hours, Professor Snyder and Assistants
Animal Husbandry 2, half semester, four hours, Mr. Schroeder
Horticulture 2, half semester, three hours, Professor Green and Assistants
Animal Husbandry 4, half semester, three hours, Mr. Drew
Drawing 2, half semester, four hours, Miss Clopath
Rhetoric 1, three hours, Professor Lansing
Mathematics 3, half semester, three hours, Mr. Roe
Horticulture 3, half semester, four hours, Mr. Cady
Dairy Husbandry 2, half semester, four hours, Professor Haecker and Assistants
Military Drill, three hours, Captain Sigerfoos, U. S. A.
Gymnasium, one hour

SOPHOMORE YEAR

First Semester

Botany (B) 1, six hours, Professor Clements and Assistants
Zoology 1, six hours, Professor Sigerfoos and Assistants
German or French 3, three hours, Professor Schlenker and Assistants, or Professor Benton and Assistants
Agricultural Chemistry 5, six hours, Professor Snyder and Assistants
Rhetoric 2, three hours, Professor Lansing
Agricultural Physics 1, three hours, Professor Stewart
Horticulture 1, or *Animal Husbandry* 6, half semester, four hours, Professor Green, or Professor A. Boss
Military Drill (B), three hours, Captain Sigerfoos, U. S. A.

Second Semester

Botany (B) 1, six hours, Professor Clements and Assistants
Zoology 1, six hours, Professor Sigerfoos and Assistants
German or French 3, three hours, Professor Schlenker and Assistants, or Professor Benton and Assistants
Agricultural Chemistry 5, six hours, Professor Snyder and Assistants
Rhetoric 2, three hours, Professor Lansing
Economics 1, three hours, Professor Robinson
Agriculture 10, half semester, four hours, Professor A. Boss and Assistants
Military Drill (B), three hours, Captain Sigerfoos, U. S. A.

JUNIOR YEAR

First Semester

Agricultural Chemistry 7, three hours, Professor Snyder and Assistants
Agriculture 5, three hours, Assistant Professor Bull
Dairy Husbandry 3, three hours, Professor Haecker
Botany 3, six hours, Professor Clements and Assistants
Economics 1, three hours, Professor Robinson
Vegetable Pathology 1, six hours, Professor Freeman

Second Semester

Agricultural Chemistry 8, three hours, Professor Snyder and Assistants
Farm Structures 4, three hours, Professor Wm. Boss
Agriculture 8 and 9, three hours, Mr. Wilson and Mr. Parker
Botany 3, six hours, Professor Clements and Assistants
Economics, elective, three hours, Professor Gray and Assistants
Animal Husbandry 9, three hours, Professor A. Boss and Assistants

SENIOR YEAR

First Semester

Agriculture 4, three hours, Assistant Professor Bull
Farm Structures 5, three hours, Professor Wm. Boss
Animal Husbandry 7, three hours, Professor A. Boss and Assistants
Comparative Physiology, six hours, Professor Sigerfoos
Elective, three hours
Elective, three hours

Second Semester

Horticultural Elective, three hours, Professor Green and Assistants
Veterinary Elective, three hours, Professor Reynolds
Agricultural Elective, three hours, Professor A. Boss and Assistants
Elective, three hours
Elective, three hours
Elective, three hours

SENIOR ELECTIVES

Greenhouse Management and Floriculture, three hours, Professor Green and Assistants
Landscape Gardening, three hours, Professor Green
Plant Breeding—Horticulture, three hours, Professor Green
Plant Breeding—Agriculture, three hours, Assistant Professor Bull

Systematic Pomology, three hours, Mr. Kohler
Agricultural Engineering, three hours, Professor Stewart
Chemistry Laboratory Courses, six hours, Professor Snyder and Assistants
Economic Entomology, three hours, Professor Washburn
Comparative Anatomy and Histology of Insects, six hours, Professor Washburn and Assistants
Elements of Bee Keeping, one hour, Professor Washburn
Anatomy and Body Nutrition, three hours, Professor Reynolds
Anatomy of Conformation of Type, three hours, Professor Reynolds
Diseases of Animals, three hours, Professor Reynolds
Advanced Meats and Judging, three hours, Professor A. Boss and Assistants.
Bacteriology, one hour, Dr. Beebe
Dairy Stock and Dairy Farm Management, three hours, Professor Haecker
Factory Dairying, three hours, Professor Haecker and Assistants
Farm Accounts, four hours, Mr. Vye
Farm Machinery, three hours, Mr. Bassett
General Forestry, three hours, Assistant Professor Cheyney
Research Work—Dairy Husbandry, Agriculture, Horticulture, Animal Husbandry, Veterinary

ACADEMIC ELECTIVES

Botany	Psychology
Economics	History
Literature	Education
Geology	Rhetoric
Zoology	

OUTLINE OF COURSE IN ANIMAL HUSBANDRY

Students who wish to specialize in Animal Husbandry are recommended to arrange their courses in the junior and senior years as follows:

JUNIOR YEAR

First Semester

Zoology 2, six hours, Professor Sigerfoos and Assistants
Animal Husbandry 12, three hours, Assistant Professor Gaumnitz
Agriculture 5, three hours, Assistant Professor Bull
Economics, elective, three hours
Dairy Husbandry 2, three hours, Professor Haecker
Animal Husbandry, elective, three hours, Professor Boss and Assistants

Second Semester

Zoology 2, six hours, Professor Sigerfoos and Assistants
Animal Husbandry 8, three hours, Professor A. Boss and Assistants
Farm Structures 9, three hours, Professor Wm. Boss
Economics, elective, three hours
Animal Husbandry 10, three hours, Professor A. Boss and Assistants
Elective, three hours

SENIOR YEAR

First Semester

Farm Structures 10, three hours, Professor Wm. Boss
Comparative Physiology, six hours, Professor Sigerfoos
Animal Husbandry 7, six hours, Professor A. Boss and Assistants
Animal Husbandry 11, three hours, Professor A. Boss or Professor
 Haecker
Elective, three hours
Elective, three hours

Second Semester

Veterinary Elective, three hours, Professor Reynolds
Animal Husbandry 14, three hours, Professor A. Boss and Assistants
Animal Husbandry 13, three hours, Professor A. Boss
Animal Husbandry 16, three hours, Professor A. Boss
Elective, three hours
Elective, three hours

JUNIOR AND SENIOR ELECTIVES FOR ANIMAL HUSBANDRY
 COURSE

Anatomy, three hours, Professor Reynolds
Dissection, three hours, Professor Reynolds
Agricultural Economics, three hours, Mr. Parker
Foods, three hours, Professor Snyder
Stock Farm Management, three hours, Mr. Wilson
Animal Taxonomy, three hours, Professor Reynolds
Home Dairying, four hours, Professor Haecker
Dairy Stock and Dairy Farm Management, three hours, Professor Haecker
Diseases of Animals, three hours, Professor Reynolds
Animal Mechanics, three hours, Assistant Professor Gaumnitz
Bibliography of Agricultural Literature
Field Crops and Seeds, three hours, Assistant Professor Bull

Animal By-Products, three hours, Professor A. Boss

Advanced Meats and Judging, three hours, Professor A. Boss

OUTLINE OF COURSE IN FORESTRY

(Numbers after subjects indicate number of courses).

FRESHMAN YEAR

First Semester

Mathematics 1, three hours, half semester, Mr. Roe

German or French 1, five hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants

Botany 1, six hours, Professor Clements and Assistants

Geology 1, three hours, Professor Hall

Rhetoric 1, three hours, Professor Lansing

Agricultural Chemistry 1, five hours, Professor Snyder and Assistants

Forestry 1, three hours, Assistant Professor Cheyney

Military Drill, three hours, Captain Sigerfoos, U. S. A.

Second Semester

Mathematics 3, half semester, three hours, Mr. Roe

German or French 1, five hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants

Botany 1, six hours, Professor Clements and Assistants

Physiography, three hours, Mr. E. M. Lehnerts

Rhetoric 1, three hours, Professor Lansing

Agricultural Chemistry 2, three hours, Professor Snyder and Assistants

Military Drill, three hours, Captain Sigerfoos, U. S. A.

SOPHOMORE YEAR

First Semester

German or French 3, three hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants

Rhetoric 2, three hours, Professor Lansing

Mineralogy 1, three hours, Professor Hall and Mr. Grout

Botany 2, six hours, Professor Clements and Assistants

Zoology 1, six hours, Professor Sigerfoos and Assistants

Drawing 1, four hours, Mr. A. Bull

Agricultural Chemistry 5, six hours, Professor Snyder and Assistants

Forestry 11, one hour, Assistant Professor Detwiler

Military Drill, three hours, Captain Sigerfoos, U. S. A.

Second Semester

German or French 3, three hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants
Rhetoric 2, three hours, Professor Lansing
Forestry 24, three hours, Professor Green
Botany 2, six hours, Professor Clements and Assistants
Zoology 1, six hours, Professor Sigerfoos and Assistants
Drawing 4, six hours, Mr. A. M. Bull
Agricultural Chemistry 5, six hours, Professor Snyder and Assistants
Vegetable Pathology 2, six hours, Professor Freeman
Military Drill, three hours, Captain Sigerfoos, U. S. A.

JUNIOR YEAR

First Semester

Entomology 3, six hours, Professor Washburn
Botany 3, six hours, Professor Clements and Assistants
Agriculture 1, three hours, Assistant Professor Bull
Economics 1, three hours, Professor Robinson and Mr. Phelan
Forestry 3, three hours, Assistant Professor Detwiler
Forestry 7, three hours, Assistant Professor Cheyney

Second Semester

First Half

Animal Husbandry, Professor A. Boss and Assistants
Forestry 12, Assistant Professor Cheyney
Horticulture 3, Professor Green and Assistants
Farm Structures 3, Professor Wm. Boss
Farm Mechanics 2, Mr. Drew
Veterinary 5, Professor Reynolds
Farm Mechanics, Professor Wm. Boss
Entomology 3, Professor Washburn
Botany 3, half semester, Professor Clements and Mr. Huff
Dairy Husbandry, Professor Haecker and Assistants

Last Half at Itasca Park

April 15 to September 1.

Forestry 3, Assistant Professor Detwiler
Forestry 5, Assistant Professor Cheyney
Forestry 6, Professor Stewart
Forestry 18, Assistant Professor Detwiler
Forestry 20, Professor Stewart
Forestry 19, Assistant Professor Detwiler

SENIOR YEAR

*First Semester**Forestry* 10, three hours, Assistant Professor Cheyney*Forestry* 9, three hours, Assistant Professor Cheyney*Vegetable Pathology* 1, six hours, Professor Freeman*Agricultural Chemistry* 12, three hours, Assistant Professor Hummel*Economics, elective*, three hours, Professor Gray and Assistants*Second Semester*

First Half

Forestry 8, Mr. Fullerton*Forestry* 23, Assistant Professor Cheyney*Forestry* 22, Assistant Professor Cheyney*Forestry* 16, Assistant Professors Cheyney and Detwiler

Second Half at Itasca Park.

April 15 to June 1.

Forestry 17, Assistant Professor Cheyney*Forestry* 4, Assistant Professor Detwiler*Forestry* 15, Professor Green*Forestry* 14, Professor Green*Forestry* 13, Professor Stewart*Forestry* 21, Professor Stewart*Forestry* 24, Professor Green

OUTLINE OF COURSE IN HOME ECONOMICS

(Numbers after subjects indicate number of courses.)

FRESHMAN YEAR

Division "A"

For graduates of the School of Agriculture

*First Semester**Mathematics* 1, three hours, Mr. Roe*Geology* 1, three hours, Professor Hall and Mr. Grout*German or French* 1, five hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants*Rhetoric* 1, three hours, Professor Lansing*Botany* 1, six hours, Professor Clements and Assistants

Second Semester

Mathematics 2, half semester, three hours, Mr. Roe
Drawing 2, half semester, four hours, Miss Clopath
German or French 1, five hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants
Rhetoric 1, three hours, Professor Lansing
Botany 1, six hours, Professor Clements and Assistants
Agricultural Chemistry 4, six hours, Mr. Wilhoit

FRESHMAN YEAR

Division B.

For graduates of approved High Schools or others of equal standing

First Semester

Rhetoric 1, three hours, Professor Lansing
Agriculture 11, three hours, Professor A. Boss and Assistants
Agriculture 1, three hours, Professor A. Boss and Assistants
Agricultural Chemistry 1, five hours, Professor Snyder
Horticulture 1, two hours, Professor Green and Assistants
Entomology 1, half semester, three hours, Professor Washburn
Domestic Science 1, four hours, Miss Shepperd
Domestic Art 1, four hours, Mrs. Blair
Drawing 1, four hours, Mr. A. Bull
Domestic Economics 1, three hours, Mrs. Boutell
Physical Training, two hours, Miss Whitridge

Second Semester

Agricultural Chemistry 3, six hours, Miss Craig
Horticulture 3, half semester, three hours, Professor Green and Assistants
Animal Husbandry 4, half semester, three hours, Mr. Drew
Domestic Science 1, four hours, Miss Shepperd
Domestic Art 1, four hours, Mrs. Blair
Drawing 2, half semester, four hours, Miss Clopath
Rhetoric 1, three hours, Professor Lansing
Mathematics 3, half semester, three hours, Mr. Roe
Horticulture 3, half semester, four hours, Mr. Cady
Dairy Husbandry 1, half semester, four hours, Professor Haecker and
Assistants
Domestic Economics, 3, three hours, Dr. Moorhead
Animal Husbandry 5, half semester, one hour, Professor A. Boss
Physical Training, two hours, Miss Whitridge

SOPHOMORE YEAR

First Semester

Botany 1 (B), six hours, Professor Clements and Assistants
Zoology 1, six hours, Professor Sigerfoos and Assistants
German or French 3, three hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants
Agricultural Chemistry 5, six hours, Professor Snyder and Assistants
Rhetoric 3, three hours, Professor Lansing
Domestic Art 2, four hours, Mrs. Blair
Domestic Science 2, four hours, Miss Shepperd

Second Semester

Botany (B) 1, six hours, Professor Clements and Assistants
Zoology 1, six hours, Professor Sigerfoos and Assistants
German or French 3, three hours, Professor Schlenker and Assistants, or
Professor Benton and Assistants
Agricultural Chemistry 5, six hours, Professor Snyder and Assistants
Rhetoric 3, three hours, Professor Lansing
Domestic Art 2, four hours, Mrs. Blair
Domestic Science 3, one hour, Miss Shepperd
Domestic Science 4, one hour, Dr. Beebe

JUNIOR YEAR

First Semester

Domestic Economics 2, three hours, Mrs. Boutell
Domestic Art 4, four hours, Mrs. Blair
Domestic Science 5, four hours, Miss Shepperd
Education 1, three hours, Assistant Professor Swift
Agricultural Chemistry 6, six hours, Professor Snyder and Assistants
Agricultural Chemistry 7, three hours, Professor Snyder and Assistants
Psychology 1, three hours, Professor Wilde and Assistants

Second Semester

Domestic Science 5, four hours, Miss Shepperd
Domestic Art 4, four hours, Mrs. Blair
Education 2, three hours, Assistant Professor Swift
Agricultural Chemistry 9, six hours, Professor Snyder and Assistants
Farm Structures 6, three hours, Professor Wm. Boss
Drawing 3, four hours, Miss Clopath
Domestic Art 3, three hours, Mrs. Blair

SENIOR YEAR

First Semester

Domestic Art 5, three hours, Mrs. Blair
Domestic Science 6, six hours, Miss Shepperd
Psychology 2, three hours, Professor Wilde and Assistants
Farm Structures 7, three hours, Professor Wm. Boss
English, elective, three hours, Professor Burton and Assistants
Elective, three hours

Second Semester

Domestic Science 6, six hours, Miss Shepperd
Domestic Art 6, six hours, Mrs. Blair
Agricultural Chemistry 13, three hours, Miss Craig
Horticulture, elective, three hours, Professor Green and Assistants
Elective, three hours
Elective, three hours

NORMAL COURSE

FIRST YEAR

Same as Freshman Year in course of Home Economics

SECOND YEAR

First Semester

Domestic Economics 2, three hours, Mrs. Boutelle
Domestic Science 5, six hours, Miss Shepperd
Domestic Art 2, four hours, Mrs. Blair
Rhetoric 2, three hours, Professor Lansing
Agricultural Chemistry 7, three hours, Professor Snyder
Psychology 1, three hours, Professor Wilde and Assistants
Botany 1, six hours, Professor Clements and Assistants
Domestic Art 3, three hours, Mrs. Blair

Second Semester

Domestic Science 5, six hours, Miss Shepperd
Domestic Art 2, four hours, Mrs. Blair
Rhetoric 2, three hours, Professor Lansing
Agricultural Chemistry 13, three hours, Miss Craig
Child Psychology, three hours, Professor Wilde and Assistants
Botany 1, six hours, Professor Clements and Assistants
Domestic Science 3, one hour, Miss Shepperd
Domestic Science 4, one hour, Dr. Beebe
Drawing 3, four hours, Miss Clopath

Courses of Study

AGRICULTURE

1. **AGRONOMY** ASSISTANT PROFESSOR BULL
Three credits (three hours per week) First semester
Open to freshmen registered in division B.
An elementary course in the study of farm management, crop rotation and the planning and platting of farms; the production and care of manures; the relation of weeds to crop production and profits; the planting, cultivating, harvesting, storing, seed-selection and marketing of grains, roots, fiber, sugar, hay and other forage crops; meadows and pastures; treatment of field crop diseases; plant selection and breeding methods.
2. **FARM DEVELOPMENT** MR. PARKER
Three credits (three hours per week) Second semester
Open to freshmen registered in division B.
It is proposed in teaching this subject to cover the elementary principles governing the science of agriculture. The work covers the origin, formation and cultivation of soils; the movement and control of soil moisture; subduing fields; a study of drainage, roads, fences, water supply; the relation of science to agriculture and farm life; a general consideration of farm practices and farming as a business.
3. **FARM MACHINERY** MR. BASSETT
Two credits, elective (four hours per week) Second semester
Open to freshmen registered in division B.
Practical suggestions and practice work are given in connection with the best methods of adjustment, handling and adaptation of the various kinds of machinery to the soil, weeds and seasons. Durability and convenience in manipulation are chief among the points considered.
4. **FIELD CROPS AND SEEDS** ASSISTANT PROFESSOR BULL
Three credits (three hours per week) First semester
Open to seniors.
Students registering for the course must have had at least one year's work in University botany. The course is outlined to occupy two lecture periods and two laboratory periods per week.
 - (a) Seeds: their identity and value.
In this course the students are made acquainted with the physical botany, the uses, identification, vitality, testing, grading and judging of all classes of field seeds. Special attention is given to the reproducing value of seeds of various grades of grains and to the importance of testing. A thesis upon some phase of the subject of seeds is required for full credit.
 - (b) Field Crops: their structure and use.
In this course are considered the botany, cultivation, and economic value of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of meadows, pastures, soilage crops, and to the production and preservation of all kinds of dry cured and ensilaged crops.
5. **THREMMATOLOGY** ASSISTANT PROFESSOR BULL
Three credits (three hours per week) First semester
Open to juniors. Given in alternate years.
Heredity, variation, law of breeding, the art of breeding, im-

provement by nature and under scientific experimentation, securing foundation stocks, value of using very large numbers, immense value of the occasional individual which can transmit qualities of peculiar value, use of an ideal, use and misuse of the score card, both numerical and graphic, intrinsic qualities, fancy points and distinguishing marks, statistical methods in breeding pedigree records of efficiency, fundamental principles underlying the arrangement of the record books, bibliography and terminology, study of the literature of breeding.

6. **PLANT BREEDING** ASSISTANT PROFESSOR BULL
Three credits, elective (three hours per week) First semester
Open to juniors. Given in alternate years.
Botany of the reproductive organs of field crops, field crop nursery management, producing new qualities by hybridizing and by change of environment, hybridizing versus cross-breeding, in-breeding and self fertilization, originating varieties and improving standard varieties by selection and by hybridizing, followed by selection, methods of disseminating new varieties, seed and plant introduction, experimentation in the theories relating to heredity, variation and practical breeding, seed growing as a farm business, seed merchandising and the breeding of each of the various field crops grown in Minnesota.
7. **AGRICULTURAL ENGINEERING** PROFESSOR STUART
Three credits, elective (six hours per week) Second semester
Open as an elective to juniors and seniors.
Subduing prairie and timber soils, land drainage, farm land mensuration and surveying; irrigation and irrigation works; roads, their location, maintenance, laws and construction, financial support; farm fences, buildings, implements and machinery.
8. **AGRICULTURAL ECONOMICS** MR. PARKER
One and one-half credits, elective (three hours per week for nine weeks) Second semester
Open to juniors.
Labor, farm finances, markets, rentals, agricultural statistics, production, exports, wages, land laws, ownership, taxes, organizations.
9. **FARM MANAGEMENT** MR. WILSON
One and one-half credits (three hours per week for nine weeks) Second semester
Open to juniors.
In this course are considered the planning of farms, crop rotation, tillage, and systems of farming. Special attention is given to revising and drafting farm plans and to arranging economic crop rotations, and application of business methods to farm operations.
10. **AGRICULTURAL PRACTICUMS**
(Four hours per week)
Opportunities to gain practical experience, to acquire greater manual dexterity in doing farm work, to secure practice in conducting experiments and to get experience in teaching agricultural subjects, are offered to college and graduate students when practicable. Students should arrange early in their course for this work, as the opportunities in plant breeding, in rural engineering, in field crops, in agricultural statistics and in assisting, instructors in the various courses are available only at irregular intervals and must be arranged for in advance.
7. **AGRICULTURAL ENGINEERING** PROFESSOR STEWART
Opportunities to gain practical experience, to acquire greater
11. **FIELD AGRICULTURE** PROFESSOR A. BOSS AND ASSISTANTS
(Three hours per week) First semester
Open to Freshman girls in Div. E.
A study of the soil origin and types of soil as affecting crop production in Minnesota; soil conditions as affecting moisture and crop growth; planning of fields and farms in consideration of classes of field crops, and the relation of crops to each other in rotation and the business of farming.

AGRICULTURAL CHEMISTRY AND SOILS

1. AGRICULTURAL CHEMISTRY

PROFESSOR SNYDER

(Five hours per week)

First semester

Open to freshmen registered in division B.

In agricultural chemistry, one term is given to the study of the elements and compounds which are of most importance in agriculture. This work is planned to prepare the student for intelligent study of the subject of the chemistry of foods, soils and fertilizers, and at the same time to familiarize him with the more important chemical changes which take place in every-day life. Laboratory practice forms a prominent feature of the work in agricultural chemistry. In the chemistry of foods, the composition of plant and animal bodies, the chemistry of the plant and of its food and growth, the chemistry of animal nutrition, digestibility and value of foods, and the laws governing the economic uses of foods, are some of the subjects considered. The composition and the utilization of farm crops for food purposes, and the application of the principles of chemistry to plant and animal life, form the basis of this work.

In dairy chemistry, the chemical and allied changes which take place in the handling of milk and its manufacture into butter and cheese and the application of these principles to the production of milk and its products form the basis of this work.

2. SOILS AND FERTILIZERS

PROFESSOR SNYDER

(Six hours per week)

Second semester

Open to freshmen registered in division B.

Some of the topics studied are: The formation of soils, adaptability of crops to different kinds of soils, chemical composition of soils, physical analysis of soils, interpretation of soil analysis, the judging, rating and scaling of soils, alkali soils, acid soils, humus and other relations to soil fertility, the factors governing the increase and decrease of the nitrogen of the soil, farm manures, their composition and uses, and their action upon soils; green manures, commercial fertilizers, special purpose fertilizers and their use; the influence of different methods of cultivation upon the fertility of the soil, the food requirements of farm crops, the rotation of crops as affecting the fertility of the soil, the income and outgo of fertility from farms where different systems of farming are followed, the general principles of soil exhaustion and soil improvement and the various factors which affect the fertility of soils. The class room work is supplemented by laboratory practice.

3. DOMESTIC CHEMISTRY

MISS CRAIG

(Six hours per week)

Second semester

Open to freshmen registered in division B.

The combination of human foods to form balanced rations, dietary studies of families, cost and value of foods, losses in the cooking and preparation of foods, cereal food products, animal food products, adulterations of foods and their detection, fuels, soaps, dye stuffs and colors, composition of common household utensils, the household water supply, preparation of home-made baking powders, bakers' chemicals, the composition, food value and characteristics of tea, coffee, chocolate, cocoa, molasses, honey, vinegar and spices, the grading and testing of wheat flour and the chemistry of bread making, form the essential parts of this work.

4. GENERAL CHEMISTRY

MR. WILHOIT

Three credits (three hours per week)

Second semester

Open to freshmen registered in division A.

Recitations, lectures, and laboratory practice. Particular attention is given to the study of the elements and compounds which are of the most importance in agriculture. The laws governing the combination of the elements by weight and volume are illustrated by numerous problems. The writing of equations, chemical nomenclature, and the periodic system of classifying

the elements are prominent features of the work. In the laboratory experiments are performed illustrating the general laws of chemistry which have a bearing upon animal and plant life.

5. AGRICULTURAL QUALITATIVE ANALYSIS MR. WILHOIT
Six credits (six hours per week) First and second semesters
Open to sophomores.

This course is arranged to meet the wants of agricultural students.

Six hours per week are given to the laboratory work and one period to a lecture and recitation. The writing of equations and the study of principles involved in the separation of the various groups and individual compounds of elements are characteristic features of this work. It is the object of this course to familiarize the student with the processes employed in qualitative analysis, so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

6. AGRICULTURAL QUANTITATIVE ANALYSIS PROFESSOR SNYDER
Three credits (six hours per week) First semester
Open to juniors and seniors.

An elementary course in quantitative analysis. The principles involved in gravimetric and volumetric analysis are studied. Two periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry and alkalimetry, the gravimetric determination of phosphorus pentoxide, the volumetric determination of calcium oxide, and the determination of nitrogen and potassium oxide. The object of this course is to prepare the student for special work in agricultural chemistry, and is required of all students who elect either course 10 or 11.

7. HUMAN AND ANIMAL FOODS PROFESSOR SNYDER
Three credits (three hours per week) First semester
Open to juniors. Given in alternate years.

Lectures. This course treats of the composition, digestibility and nutritive value of human and animal foods. The chemistry of plant growth particularly the factors which influence their composition and nutritive value, forms an essential part of this course. The processes employed in the preparation of foods, as the milling of wheat and other cereals, the economic uses of human and animal foods, the comparative value of foods, and the chemical methods employed in human nutrition investigations, particularly in proteid and carbohydrate metabolism, and the losses of energy from the body, are studied. Dietary studies, including the cost of nutrients, and influence of different methods of preparation upon their nutritive value, are also included in the work. It is the object of this course to familiarize the student with the fundamental principles of nutrition and the use of the literature upon the subject. Special attention is given to the economic production of foods and their utilization for human and animal food purposes.

8. SOILS AND FERTILIZERS PROFESSOR SNYDER
Three credits (three hours per week) Second semester
Open to juniors. Given in alternate years.

Lectures. This course treats of the relation of soils and their fertility to the production of crops, and includes a study of the sources of plant food and the influence of tillage and manures upon the chemical and allied physical and biological changes which take place in the soil in rendering plant food available. Rock disintegration and soil production, the various types of soil formed from different kinds of rocks and their agricultural value, and the inherent fertility of soils, form an essential part of the work. The control of the water in the soil, soil solutions and leachings, the presence of injurious acid compounds and alkaline salts, the various methods employed for the improvement of soils, soil organisms and their

influence upon fertility, the organic compounds of the soil and the part which they take in soil fertility the increase and decrease of the organic matter and the nitrogen of the soil as influenced by different methods of farming, manures, and the causes of soil exhaustion and means employed, the analyses of soils, and the application and interpretation of the results, uses of commercial fertilizers and green and farm fertilizers for conservation of fertility, adaptability of crops to soils and rotation of crops as affecting the fertility of the soil are some of the topics discussed. Soil judging, rating and scaling form a part of the work.

9. THE ANALYSIS OF FOODS (elective)

PROFESSOR SNYDER

Three credits (six hours per week)

First or second semester

Open to juniors and seniors.

This work includes the determination of water, ash, starch, sugar, cellulose, pentosans, fats, proteids, and the different forms of nitrogen in food stuffs, the use of the calorimeter, and the polariscope in food analysis. Before completing the work, each student makes a complete proximate analysis of some food material. This course is planned to meet the wants of those who desire to become familiar with the methods employed in the analysis of foods and in nutrition investigations.

This course includes, also, the analysis of dairy and animal products, as fodders, milk, butter, cheese, and animal feces. Special features of the course are the determinations of volatile fatty acids, iodine absorption, specific gravity, and the saponification equivalent of fats. The object of this course is to meet the wants of those who desire to become familiar with the methods of investigations employed in research in dairy chemistry.

10. THE ANALYSIS OF SOILS AND FERTILIZERS (elective)

PROFESSOR SNYDER AND MR. WILHOIT

Three credits (six hours per week)

Open to juniors and seniors.

(a) The chemical analysis of soils.

Laboratory practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. Particular attention is given to the study of the organic compounds of soil, and an opportunity is offered for the study of experimental soil work applied to field investigations.

(b) The physical analysis of soils.

Laboratory practice in the physical analysis of soils by means of Hilgard's elutriator, and the sedimentation methods as modified by the use of centrifugal apparatus.

Course 10 is intended for students who desire to make a specialty of the subject of soils.

11. SPECIAL PROBLEMS (elective)

PROFESSOR SNYDER, ASSISTANT

PROFESSOR HUMMEL AND MR. WILHOIT

Seminar and laboratory work in the study of special problems in agricultural chemistry, as the analysis of water for irrigation purposes, the adulteration of foods, dietetics, and problems in agricultural technology.

12. CHEMISTRY OF FOREST PRODUCTS

ASSISTANT PROFESSOR HUMMEL

Three credits (three hours per week)

First semester

Open to seniors.

In this course a special study is made of the products of the forest other than for timber and fuel. The products studied include cellulose for the manufacture of paper, sugar, tanning materials, turpentine, tar, oils, resin, waxes, gums, creosote, wood alcohol, acetic acid, acetone, essential oils, charcoal, camphor, and medicinal products. The subjects of paint and methods for the preservation of wood are also taken up. At

the beginning of the course a short time is devoted to a review of organic chemistry, special attention being given to those compounds found in wood or closely related to it. A thesis on some subject relating to the chemistry of forest products is required in this course.

13. DOMESTIC CHEMISTRY AND DIETETICS

MISS CRAIG

Three credits (six hours per week)

Second semester

Open to seniors.

Lectures and laboratory practice. Advanced course. Courses 7 and 9 required as preliminary preparation.

ANIMAL HUSBANDRY

1. STUDY OF BREEDS

MR. SCHROEDER

(Three hours per week)

First semester

Open to freshmen registered in division B.

The market classes of horses, cattle, sheep, and swine are taken up briefly to bring out the form, quality, and condition desirable and common to the different classes. This is followed in each class of stock with the most common and valuable breeds for the state. These are studied carefully as regards their characteristics and origination, and as to their adaptability to the different Minnesota conditions. This work is illustrated with stock from herds and flocks maintained at the University farm for this purpose.

2. STOCK JUDGING

MR. SCHROEDER

(Four hours per week)

Second semester

Open to freshmen registered in division B.

Score cards are used to an extent sufficient to familiarize students with that method of judging, and special efforts are made to do systematic and closely critical work in the selection of animals representative of the market classes of stock. Living specimens are used and rings made up for the student contests in stock judging. In connection with the work in dressing and curing meats, the judgment passed on live animals for the block is verified by score cards, judgment of the dressed carcasses, and by actual block tests. These tests are made by the students and bring out the percentage of meat in each commercial cut of the carcass. The quality of meat is passed upon in this connection by experts, and a careful report made to ascertain the type of animals best calculated for the production of the most meat of the best quality.

3. FEEDING AND BREEDING

PROFESSOR BOSS AND ASSISTANT

PROFESSOR GAUMNITZ

(Three hours per week)

Second semester

Open to freshmen registered in division B.

Feeding, first nine weeks.

The principles of feeding as applied to the production of horses, cattle, sheep and swine, are taught. Special attention is given to the choice and preparation of food for animals during different periods of growth and during the time they are used for breeding purposes and to summer feeding and pasturage. Practice is given in compounding rations that will include in the best manner the food stuffs commonly produced on the farm.

ANIMAL BREEDING, last nine weeks

Open to freshmen registered in division B.

Students receive instruction in the principles that govern breeding; in the influences that affect heredity and in the care and management of breeding stock. Pedigree receives careful consideration and each student is required to make out pedigrees of two or more pure-bred animals. They are also required to become familiar with methods of keeping live stock records of all kinds.

4. **POULTRY** MR. DREW
 (Three hours per week) Second semester
 Open to freshmen registered in division B.
 The instruction in this subject will include the following topics:
 History and characteristics of the leading breeds of poultry;
 breeding, rearing and management of fowls for eggs and for
 the market; planning, building and arrangement of poultry
 houses; managing incubators and brooders. A model poultry
 house, containing pens of the most improved breeds, incu-
 bator cellar, work-room, etc., has been provided, where ex-
 perimental work and practical instruction are carried on.
5. **MEATS** ASSISTANT PROFESSOR GAUMNITZ
 (One hour per week) Second semester
 Open to freshmen girls registered in division B.
 The instruction given to the students in home economics in the
 subject of meats pertains to the selection and value of dif-
 ferent classes of meat and to the best methods of curing and
 preserving.
6. **STOCK JUDGING (elective)** ASSISTANT PROFESSOR GAUMNITZ
 Three credits (six hours per week) First semester
 Open to sophomores.
 This course is calculated to meet the needs of students desiring to
 become expert stock judges and of those who wish to study
 animal form with a view of becoming breeders of superior
 animals.
 Score card work in combination with the presence of living speci-
 mens is a feature of this course. Students are drilled in judg-
 ing from the standpoint of breed, type, form, stamina, quality,
 breeding, capacity, suitability for feeding and for general and
 specific production.
7. **STOCK JUDGING** PROFESSOR BOSS AND ASSISTANT PROFESSOR GAUMNITZ
 Three credits (six hours per week) First semester
 Open to seniors.
 An advanced course consisting of practice in judging market
 classes of fat stock and special work with breeding stock.
 Trips of inspection to neighboring stock farms will be made
 and work given in county fair judging where suitable arrange-
 ments can be made.
8. **STOCK BREEDING** PROFESSOR BOSS
 Three credits (three hours per week) Second semester
 Open to juniors.
 Discussion of the principles of stock breeding as affecting
 breed maintenance and breed formation; standards of excellence
 and comparison of standards of breeds; heredity and the
 influences affecting it; prepotency, fecundity and their rela-
 tion to successful breeding; the influence of nutrition on animal
 growth and form, and the effect of artificial conditions, early
 maturity, selection and pedigree, and a study of the early history
 of breeds of live stock and of methods of breeders famous in
 live stock improvement.
9. **LIVE STOCK FEEDING AND MANAGEMENT** PROFESSOR BOSS
 Three credits (three hours per week) Second semester
 Open to sophomores.
 The principles of feeding as applied to economical production;
 feeding rations, feed stuffs, methods of feeding, care and man-
 agement of breeding and fattening stock, management of ani-
 mals during pasture, yard and stall feeding for the block, selec-
 tion of animals for the feed lot, and stabling and stable
 management suitable for the various classes of live stock. The
 work is based on the investigations of the experiment stations
 and a careful review of station bulletins and publications will
 be made.

10. STOCK FARM MANAGEMENT MR. WILSON
Three credits (three hours per week) Second semester
Open to juniors.
In this course special attention is given to the crops and rotations that fit in with live stock farming, economy of feeds and pasture production, and solution of confronting problems is made the leading feature.
11. ANIMAL NUTRITION STUDIES PROFESSOR BOSS
Three credits (three hours per week) First semester
Open to seniors.
Original work in special live stock problems related to meat production followed by a thesis; sufficient original work must be done to form a reliable basis for conclusions.
12. MEATS ASSISTANT PROFESSOR GAUMNITZ
Three credits (three hours per week) First semester
Open to juniors.
A continuation of studies in meats as outlined in the school course. Supplemented by dissection and studies of muscular structure of various kinds of meat.
This course is designed especially for studying meat making animals and their products. Under general guidance each student makes up rings of animals which he studies in detail, at every step from the live state until the different parts are cooked and tested at the table. Full records and conclusions, as well as illustrations, are required in thesis form.
13. LIVE STOCK RECORDS AND RESEARCH PROFESSOR BOSS
Three credits (six hours per week) Second semester
Open to seniors.
This course will consist of reviewing literature upon different phases of live stock production. The Experiment Station records and other sources of information will be used largely. This together with original work will form the basis of extended compilation of material on live stock husbandry, and a thorough study of systems of keeping and compiling stock records upon stock farms and at experiment stations. Sufficient actual practice will be required to become familiar with live stock records and herd books.
14. ANIMAL BY-PRODUCTS PROFESSOR BOSS AND MR. PATERSON
Three credits (three hours per week) Second semester
Open to seniors.
Individual study of the by-products manufactured at the large packing houses will be required of each student. The value and place that each has in economic use is considered.
15. ADVANCED MEATS AND JUDGING PROFESSOR BOSS AND ASSISTANT
PROFESSOR GAUMNITZ
Three credits, elective (six hours per week) Second semester
Open to juniors and seniors.
Work along this line is a continuation of that begun in course 12. More attention is given the more important details concerning meat and a minute study of its physical and chemical composition is required.
16. ANIMAL MECHANICS PROFESSOR REYNOLDS AND ASSISTANT
PROFESSOR GAUMNITZ
Three credits (three hours per week) Second semester
Open to seniors.
A study of the mechanical effects of different relationships of bone and muscle in the animal body. This applies particularly to horses. The entire feet and legs as well as the body will be studied and made clear by apparatus and original illustrations.
17. LIVE STOCK PRACTICUMS MR. SCHROEDER
Feeding and stable management of cattle, horses, sheep and swine, recording and calculating amounts of pasturage ob-

tained from different forage crops, keeping herd records, writing pedigrees and recording animals, calculating feeding records and cost of production, mechanical analysis of carcasses of animals to determine total amount of meat, and proportionate amounts of fat and lean, determinations of fat and lean meat with specially designed apparatus; calculating percentage of different parts of the carcass.

BOTANY

1. GENERAL BOTANY PROFESSOR CLEMENTS, ASSISTANT PROFESSORS
TILDEN AND ROSENDAHL, MESSRS. HUFF AND BUTTERS
Six credits (six hours per week) First and second semesters
Open to freshmen.
Greenhouse study of the behavior and structure of flowering plants, following the life cycle from germination to seed production; laboratory study of the evolution of the plant kingdom, and the underlying principles of plant life; laboratory and greenhouse work in the identification and relationship of flowering plants, together with field work on the plants of forest and grassland; practical papers on selected topics; viz., bacteria, plant growth, evolution, etc.
2. ADVANCED BOTANY PROFESSOR CLEMENTS, ASSISTANT PROFESSORS
TILDEN AND ROSENDAHL
Six credits (six hours per week) First and second semesters
Open to sophomores.
Systematic work in the naming and classification of plants, chiefly of the groups of economic importance, i. e., flowering plants, fungi and algae, with emphasis on the common plants of Minnesota; ecological study in the greenhouse of the structure and meaning of the adaptations of root, stem and leaf, and in the field of the principles of plant distribution, migration and grouping; cytological study of growth, production of pollen and egg-cells, fertilization, hybridization and seed formation; one practical paper each semester, cytology of plant breeding and the botany of a group of economic plants for horticultural students, plant adaptations and the life history of a forest for forestry students.
3. PHYSIOLOGY AND ECOLOGY PROFESSOR CLEMENTS AND MR. HUFF
Six credits (six hours per week) First and second semesters
Open to juniors.
Study of the factors which make the plant's home, viz., water, light, soil, heat, etc.; response of the plant to its home, absorption, transport, water-loss, food-making, storage, growth, fertilization and reproduction; adaptation of plants to their various homes, and the origin of new forms by selection, adaptation, mutation and hybridization; structure and development of vegetation, i. e., grouping, migration, competition, acclimatization, invasion, succession, zonation, etc. of plants; one practical paper each semester on selected topics, e. g., acclimatization, adaptation, origin of new forms, vegetation of Minnesota, of North America, etc.
7. FLOWERING PLANTS ASSISTANT PROFESSOR ROSENDAHL
Six credits (six hours per week) Both semesters
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.
The course is designed to afford the student an opportunity to become proficient in the determination of plant species and plant types, as well as to show the genetic development and relationships of the flowering plants. Lectures, reference reading, laboratory, greenhouse and herbarium work, together with field work in the fall and spring.

8. **ECOLOGY** PROFESSOR CLEMENTS
 Six credits (six hours per week) Both semesters
 Open to those who have completed courses 1, 2 and 3; the laboratory fee is three dollars per semester.
 A critical study of plant habitats by means of instruments, and the adaptations produced by water and by light, together with a careful examination of the causes and reactions of plant formations. Class discussions and quizzes, field and greenhouse work.
9. **PLANT PHYSIOLOGY** PROFESSOR CLEMENTS
 Six credits (six hours per week) Both semesters
 Open to those who have completed courses 1, 2 and 3; the laboratory fee is three dollars per semester; alternates with course 8.
 A study of the relations of factor, function and structure in the various organs of the plant, with special reference to absorption, transpiration, photosynthesis, respiration, irritability, and reproduction. Class discussions and quizzes, greenhouse and field work.
11. **INDUSTRIAL BOTANY** ASSISTANT PROFESSOR TILDEN
 Six credits (six hours per week) Both semesters
 Open to technical students who have completed course 1 and to academic students who have completed courses 1 and 2; the laboratory fee is three dollars per semester.
 A study of the origin, distribution and cultivation of plants, yielding products of economic value, the nature and use of these products, and the processes by which they are obtained from the plants. Lectures, demonstrations, topics and laboratory work.

VEGETABLE PATHOLOGY AND BOTANY

1. **PLANT PATHOLOGY** PROFESSOR FREEMAN
 Six credits (six hours per week) First and second semesters
 Open to juniors.
 General outline of the diseases of plants due to fungus organisms; a special study of the life histories and classification of the most important plant diseases, particularly those affecting economic plants of Minnesota. Thesis work and specialization according to the interests of the students; for instance, for forestry students, diseases of forest trees; for agronomy students, diseases of cereal crops, etc. Special attention is paid to methods of prevention and cure. Lectures, reference reading, laboratory and thesis work.
2. **WOOD TECHNOLOGY** PROFESSOR FREEMAN
 Three credits (six hours per week) Second semester
 Open to sophomores in forestry course.
 A comprehensive study of the structural features of types of the most important woods of commerce; special reference to the woods of the United States, and particularly those of this state. Structural development in the life of the tree. Physical and mechanical characters as related to the structural features. A comparative study of a large number of woods with a view to identification and classification. Thesis work on the detail studies in the histology of woods.

DAIRY HUSBANDRY AND ANIMAL NUTRITION

1. **DAIRY STOCK AND DAIRY FARM MANAGEMENT** PROFESSOR HAECKER
 Three credits, elective (three hours per week)
 The lectures cover a brief history of the dairy breeds. The fundamental principles of breeding for milk production, the rearing of

dairy stock with the object of developing the highest efficiency in the mature animal and the study of the gross anatomy of the dairy cow in its relation to milk production, form essential features of the course. One hour per week is given in tracing pedigrees and in practice work in the management, care and judging of dairy stock.

2. BUTTER MAKING PROFESSOR HAECKER AND ASSISTANTS
 (Four hours per week)
 The running of separators; ripening and churning of cream; how to ripen cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score card.
3. PRINCIPLES OF ANIMAL NUTRITION PROFESSOR HAECKER
 Three credits (three hours per week) First semester
 Open to juniors.
 Lectures and class room work. The principles of nutrition and their relation to the economic production of animals and animal products form the basis of this course. Practice work is given in formulating and compounding rations, in the study of the comparative value of food stuffs and other problems relating to feeding.
4. FACTORY DAIRYING PROFESSOR HAECKER
 Elective Second semester
 Open to juniors.
 This is offered during the session of the dairy school, beginning November 18th. Lectures in the forenoon on dairy bacteriology, dairy chemistry, the care of milk and cream, lactic cultures, flavors, cleaning milk, cream ripening and churning, working and packing butter. In the afternoon, students are given two and a half periods' practice in the factory training rooms and in the dairy laboratory.
5. NUTRITION RESEARCH PROFESSOR HAECKER
 Three credits (elective) First semester
 Open to seniors.
 Seminar and laboratory work in the study of animal nutrition problems. This course is open to advanced students and is offered during the last half of the first and the first half of the second semester. The student is required to become familiar with the literature of some phase of animal nutrition, outline and conduct and investigation under the supervision of the instructors of the department, and prepare a suitable report of the investigation. The object of this course is to familiarize the student with the methods employed in the study of animal nutrition problems.

DOMESTIC ART

1. ELEMENTARY SEWING MRS. BLAIR
 (Four hours per week) First and second semesters
 Open to freshmen registered in division B.
 Instruction is given in hand-sewing, including the different stitches, hems, seams, gussets, plackets, fastenings and the various kinds of darning and patching, taking up the practical application of each. Talks are given on the use and care of the work basket, touching upon the history of its implements, and upon the textiles, cotton, wool, silk and linen.
2. DESIGNS IN DRAFTING MRS. BLAIR
 Four credits (four hours per week) First and second semesters
 Open to sophomores.
 Each student is given instruction in designing, drafting, cutting and making of children's garments, also underwear for adults. The drafting is taught by a simple method in which only a tape

line and square are used. Lecture work deals with the selection of suitable material and the care of the underwear.

3. **TEXTILES** MRS. BLAIR
 Three credits (three hours per week) Second semester
 Open to juniors.
 A course in textiles is also given the first semester. This includes the study of cotton, linen, flax and wool, the manufacture of the different materials. The student is required to make a note-book containing sample of each material as it is studied.
4. **ADVANCED DESIGNING, DRAFTING, ETC.** MRS. BLAIR
 Six credits (six hours per week) First and second semesters
 Open to juniors.
 Instruction is given in designing, drafting, fitting and finishing a gown; also a color study from nature in reference to harmony of color in dress. Lectures are given upon proper dress, its style, neatness and suitability to the wearer.
 Practice Teaching.
5. **HOUSEHOLD ART** MRS. BLAIR
 Three credits (three hours per week) First semester
 Open to juniors.
 Household art lectures are given upon house and grounds, noting the distinctive character of the country home; the sanitary conditions involved in the selection of the site of the house; also the influence of the outlook, an elementary study of architecture in connection with planning a house; instruction in the fundamental value of color, form and design; training the taste and emphasizing the laws of hygiene that should influence the selection of materials and styles in the finishings and furnishings of the house.
6. **HANDICRAFT** MRS. BLAIR
 Three credits (six hours per week) Second semester
 Open to seniors.
 Pottery, basketry, leather work, weaving, crocheting and knitting are taken up in this course and studied in their simpler forms.

DOMESTIC ECONOMICS

1. **HOME ECONOMICS** MRS. BOUTELLE
 (Three hours per week) First semester
 Open to freshmen registered in division B.
 This course deals with the problems of economics arising in the home; generic lines of expenditure; values; business methods; standards of living; constructive agencies for economic betterment in the home; lectures, problems and recitations.
2. **EVOLUTION AND ADMINISTRATION OF THE HOME** MRS. BOUTELLE
 Three credits (three hours per week) First semester
 Open to juniors.
 The home as a social and economic institution and its evolution from primitive conditions; evolution of industrial, social, religious and economic influences in the home; the relation of the home to civic life. The organization and maintenance of a home; the home as a place and an opportunity for the right development of the physical and spiritual natures; lectures, problems and recitations.
3. **DOMESTIC HYGIENE** DR. MOORHEAD
 (First nine weeks) Second semester
 Open to freshmen registered in division B.
 Several lectures will be given upon maidenhood, maternity and infancy. These special lectures will be supplemented by the regular lectures which consider the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits as well as upon heredity. The aim is to impress the truth that a knowledge of and obedience to the laws of hygiene are essential to the preservation as well as the restoration of health.

DOMESTIC SCIENCE

1. ELEMENTARY DOMESTIC SCIENCE MISS SHEPPERD
 (Four hours per week) First and second semesters
 Open to freshmen registered in division B.
 Fuels. Composition, source and available power for household use are considered together with various appliances used in the culinary art.
 Cooking. The composition, digestibility, food and money value of vegetables, cereals, breads, are carefully studied, and possible losses in preparing and cooking are elaborated by the use of suitable laboratory exercises. The cooking of vegetables, cereals, breads, fruits, jellies, pickles, preserves, etc., are special topics considered.
 Research work is directed largely toward acquiring reliable data regarding the composition, digestibility, comparative food and money values of such materials as are used in the bi-weekly laboratory practice.
 Laundering. During the first half of the second semester the principles of laundering are taken up; removing stains, dyeing, bleaching, etc., as well as the right use of chemicals and machinery in the laundry receive due attention. The comparative value of starches and bluing is studied. The use of hand and commercial laundry machinery is taught by means of demonstration, observation and reading, text-books, lectures, assigned readings and recitations.

2. DOMESTIC SCIENCE MISS SHEPPERD
 Two credits (four hours per week) First semester
 Open to sophomores.
 The library reading and class room discussions are limited to reliable data, and the practical work aims to illustrate ways in which foods may be best prepared and served.

3. DOMESTIC SCIENCE MISS SHEPPERD
 One credit (one hour per week) Second semester
 Open to sophomores.
 Instruction consists of discussions in regard to the conditions necessary to healthfulness; the general application of sanitary principles in relation to food, air and water; care of plumbing; heating, lighting and ventilating apparatus; disposal of kitchen waste, etc.

4. BACTERIOLOGY DR. BEEBE
 One credit (one hour per week, nine weeks) Second semester
 Open to sophomores.
 Lectures once a week during the second semester of the sophomore year. Domestic bacteriology; bacteriology of the common infectious diseases.

5. DOMESTIC SCIENCE MISS SHEPPERD
 Four credits (four hours per week) First and second semesters
 Open to juniors.
 Students practice teaching under supervision and independent practice in preparing and serving meals. The object of the former is to train students to teach successfully under varied conditions, thus enabling them to acquire ability to lead pupils to work rapidly, quietly, harmoniously and successfully. The object of the practice work is to ensure an understanding of approved methods and attain efficiency in performing and supervising such work. Special attention is given to methods of teaching. Students are required to elaborate syllabi of lessons on certain topics such as water, air, etc. General information concerning their class work in practice teaching is required in the form of an itemized account, i. e., kind and amount of materials used, number of students present, cost of lessons, etc. The practice teaching must cover at least twenty recitations. Library reading, observation, text book, lectures and discussions.

6. DOMESTIC SCIENCE

Six credits (four hours per week)

MISS SHEPPERD
First and second semesters

Open to seniors.

The dining room in its different phases of equipment, care, etc.; labor saving devices and the possible application of business methods in housekeeping receive due consideration. Independent teaching with as much practice as possible in selecting food materials at the market, preparing and serving with limited means.

This is the culmination of the student's school work and each is expected to show her ability to use knowledge by preparing floor plans showing equipment, with details for construction and tentative cost of a laboratory kitchen as well as to make lesson outlines, practice their use and revise and perfect them as far as possible.

DRAWING

1. MECHANICAL DRAWING

(Four hours per week)

MR. A. M. BULL
First semester

Open to freshmen registered in Division B.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises, then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, outbuildings, and machinery. As practical subjects for their designs, students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of construction.

2. FREE-HAND DRAWING

(Four hours per week) one-half semester

MISS CLOPATH
Second semester

Open to freshmen.

The study of nature forms, including drawings from plants, landscape, animals and from figures posed. The study of perspective and drawing from objects. Exercises in composition.

3. DESIGNING

Two credits (four hours per week)

MISS CLOPATH
Second semester

Open to juniors.

Exercises in the various forms of decorative work. Adaptation of plant forms, stencils, lettering. Original designs in different styles for articles of household use. Lectures on composition and principles of design.

4. TOPOGRAPHICAL DRAWING

Three credits (six hours per week)

MR. A. M. BULL
First semester

Open to sophomores.

Topographic drawing and mapping; exercises in lining and lettering, tracing and blue printing.

5. TOPOGRAPHICAL DRAWING

Three credits (six hours per week)

MR. A. M. BULL
Second semester

Open to sophomores.

Topographical drawing and mapping, platting, landscape designing.

ECONOMICS

1. ELEMENTS OF ECONOMICS

PROFESSOR ROBINSON, DR. PHELAN

AND MR. COULTER

Three credits (three hours per week)

Repeated each semester

Open to sophomores, juniors, and seniors; designed for those who desire a general knowledge of economics and as an introduction to the more advanced courses offered in the department. Required of all taking the six year medical course.

A thorough course in the elements of economic theory, with special reference to present day economic and social problems. McVey's *Outline* and a text-book, supplemented by lectures and problems, with a weekly quiz.

2. **ECONOMIC GEOGRAPHY** PROFESSOR ROBINSON
 Three credits (three hours per week)
 Open to sophomores, juniors, and seniors.
 A study of the economic basis of modern civilization. The course embraces (1) a brief survey of the history of commerce prior to the modern period; (2) an analysis of the causes, both in nature and man, which control the development and the localization of industry and commerce; (3) a summary view of the development of transportation in relation to commerce; (4) some mention of the principal materials of commerce; and, (5) a more detailed consideration of the natural resources, chief industries, commercial products, and commercial relations of the leading countries. Special attention is given to the United States and to international trade routes, both by land and sea. Text-book, supplemented by lectures, reports on special topics, and quiz.
3. **MODERN INDUSTRIAL AND COMMERCIAL HISTORY** PROFESSOR GRAY
 Three credits (three hours per week)
 Open to sophomores, juniors, and seniors; may be taken in conjunction with course 1 or course 2; both semesters must be completed before credit is given for the first semester.
 The industrial and commercial history of western Europe and America since the middle of the eighteenth century. The effects of modern inventions and political changes on industry and trade. Lectures with prescribed topical readings. One written report of considerable length will be required each semester.
4. **ADVANCED ECONOMICS** PROFESSOR ROBINSON
 Three credits (three hours per week)
 Open to those who have completed course 1; required for a major in economics.
 An advanced course in general economics, devoted largely to a study of recent theories of distribution.
 Assigned readings, reports, and discussions.
5. **MONEY AND BANKING** DR. PHELAN
 Three credits (three hours per week)
 Open to those who have completed course 1.
 Repeated each semester
 The history and theory of money; nature and uses of credit; functions of banks, trust companies, and other financial institutions; foreign exchange and the settlement of international balances. Lectures, text-book, assigned readings, and discussions.
28. **FINANCIAL HISTORY OF THE UNITED STATES** DR. PHELAN
 Three credits (three hours per week)
 Open to those who have completed courses 1 and 5.
 Second semester
 The main lines of our financial development, including our monetary and banking history, are traced by means of lectures. Readings in the literature of the subject and topics for investigation are assigned. Lectures, text-book, assigned readings, and discussions.
6. **PUBLIC FINANCE** PROFESSOR ROBINSON
 Three credits (three hours per week)
 Open to those who have completed course 1.
 First semester
 The development of the state as an economic organism. Public expenditures from the view point of public wants. Budget systems of the leading countries with special emphasis on the United States. Public revenues from public domains and industries. Principles, incidence, and administration of taxation. The theory of public debts. Text-books, supplemented by lectures and assigned readings.
7. **PROBLEMS IN TAXATION** PROFESSOR ROBINSON
 Three credits (three hours per week)
 Open to those who have completed course 6.
 Second semester
 Study of tax systems, tax reforms, and special forms of taxation, such as the mortgage, corporation, and inheritance taxes.

Based on Seligman, *Essays in Taxation*, and reports of state tax commissions with lectures and reports on special topics.

8. ECONOMICS OF TRANSPORTATION AND COMMUNICATION

PROFESSOR ROBINSON

Three credits (three hours per week)

Second semester

Open to those who have completed course 1 and to students in the technical colleges.

A general course on the history and theory of transportation and communication with special reference to the United States; early routes and methods of migration and commerce; causes determining the location of railways; effect of steam and electricity in the consolidation of industries and of nations; signal systems, the post, telegraph and telephone; parcels post and express service; economic functions and relations of highways.

14. ECONOMICS OF AGRICULTURE

MR. COULTER

Three credits (three hours per week)

Second semester

Open to those who have completed course 1 or course 2, and to others by special permission of the instructor.

Preliminary survey and classification of industries as extractive, manufacturing, and distributive; and comparison of the several extractive industries in the United States, viz., fishing, forestry, grazing, farming, and mining. Historic development of agriculture and comparison of existing systems, with reference to stage of economic development and geographic conditions. Transition in the United States from extensive to intensive and from general to specialized farming in relation to the law of decreasing returns. Markets, transportation facilities, and other causes affecting the value of land and the prices of farm products. The size, organization, labor-system, and ownership of farms as bearing on economic efficiency and social and political conditions. Lectures, assigned readings, reports on special topics and quiz.

23. ECONOMICS OF FORESTRY AND IRRIGATION

MR. COULTER

Three credits (three hours per week)

First semester

Open to those who have completed course 1 or course 2.

Preliminary survey of forest controls and forest influences. In this connection, special attention to the progress of the national irrigation works in relation to economic development, land laws, and land tenure. Location and value of the extant forest resources of the United States. Intensive study of the forest industry, covering: (1) history and processes, (2) employees, (3) division into stages (logging, sawing, etc.), (4) internal organization of each, (5) transportation and marketing, (6) economic relations to other industries, (8) share of forest products in foreign commerce, (9) economic necessity of a scientific system of forestry. Lectures, assigned reading, and reports.

EDUCATION

Course 1 in philosophy and courses 1 and 2 in education are specified as necessary for the University Teacher's Certificate. One other three-hour course for a half year is required for this certificate, and is elective from the courses in education.

1. HISTORY OF EDUCATION TO THE REFORMATION

ASSISTANT PROFESSOR SWIFT

Three credits (three hours per week)

First semester

Open to juniors and seniors.

An introductory study in the history of education conducted by means of lectures, assigned readings, discussions and reports. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts of educational history, and some ease in the methods of historical study. An attempt is made to bring out education as one phase of civilization and to show the connection of schools with other

social institutions. Attention will be given especially to an examination of the schools of Greece and of Rome, the education of the early Christian centuries, the development of different types of schools in Medieval times, the rise of the university and of the humanistic schools of the Renaissance.

2. HISTORY OF MODERN EDUCATION ASSISTANT PROFESSOR SWIFT
 Three credits (three hours per week) Second semester
 Open to juniors and seniors who have taken course 1 in education.
 A somewhat intensive study of the periods in the history of modern education, with special reference to the development of the various national systems of public instruction. Different types of educational theory are considered in connection with a study of the men who first advanced them, and of the schools in which they were first put into effect. This course is a direct preparation for an understanding of the educational systems, theories, and practices of the present.

ENTOMOLOGY

1. GENERAL ENTOMOLOGY PROFESSOR WASHBURN
 (Three hours per week) First semester
 Open to freshmen registered in division B.
 Structure and classification of insects. The dissection of type, life history and habits of leading forms. Each student is required to make a collection of at least fifty insects.
2. ECONOMIC ENTOMOLOGY PROFESSOR WASHBURN AND MR. RUGGLES
 Three credits, elective (three hours per week) First semester
 Lectures upon injurious insects of Minnesota and best methods of combating the same. The use of insecticides and spraying machinery. Beneficial insects.
3. FOREST ENTOMOLOGY PROFESSOR WASHBURN AND MR. RUGGLES
 Three credits (six hours per week) First semester
 The students in this course must have a thorough, practical training in elementary entomology and economic entomology in order to put into practical use in field work the principles to be learned in both of these courses. The student will be directed in a special study of insects affecting the forest and will be encouraged in doing field work, collecting, identifying, and in the life history of forest insects.
 Open only to students in the forestry course.
4. COMPARATIVE ANATOMY AND HISTOLOGY OF INSECTS MR. RUGGLES
 Three credits, elective (six hours per week)
 A detailed study of structure of representatives of different orders of insects.
5. ELEMENTS OF BEE KEEPING PROFESSOR WASHBURN
 One credit Second semester
 Open to juniors and seniors.
 One lecture a week and work in apiary during spring term.
 Offered to those qualified for the work.
6. SPECIAL PROBLEMS (elective) PROFESSOR WASHBURN
 For graduate students only First or second semester

FARM STRUCTURES AND FARM MECHANICS

1. CARPENTRY MR. WHITE
 (Four hours per week) First semester
 Open to freshmen registered in division B.
 Instruction is given by means of lectures on the care and use of the common carpenter tools, such as should be found on every farm; also on methods of farm building construction, framing, laying out rafters, stairways, estimating building material, painting, etc. In the carpenter shop students are

required to make such exercises as will give them some practice in using carpenter tools. They are required to make mortise joints, splices, drawing boards, hammer handles, eveners, cup-boards, etc.

Each student is required to file his own saws, sharpen his planes, chisels, etc., and to lay out rafters for buildings.

2. **BLACKSMITHING** MR. DREW
 (Four hours per week) Second semester
 Open to freshmen registered in division B.
 The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffle-tree-irons, tongs, cold chisels, punches, in short to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

3. **CARPENTRY FOR FORESTERS** PROFESSOR W. BOSS
 Three credits Second semester
 Open to juniors.
 Lectures and practice work on care and use of tools used in lumbering; saw filing; construction of camp buildings, bridges, etc.

4. **FARM STRUCTURES** PROFESSOR W. BOSS
 Three credits (three hours per week) Second semester
 Open to juniors.
 Lectures and practice work are given in laying out plans for farm buildings. The questions of location, size, convenience, methods of construction, materials, heating systems, water systems, ventilation, sewage disposal, painting, durability, cost, etc., are discussed.

5. **FARM STRUCTURES** PROFESSOR W. BOSS
 Three credits (three hours per week) First semester
 Open to seniors.
 The practical application of principles given in course 1.
 Each student selects an imaginary or real farm and makes drawings showing location of buildings, drives, yards, fences, etc., paying particular attention to locating each building properly and planning them so as best to meet the requirements of each individual farm and the means at hand for erecting them. Specifications and estimates of cost of buildings are also made.

6. **FARM STRUCTURES** PROFESSOR W. BOSS
 Three credits (three hours per week) Second semester
 Open to juniors.
 Lectures and practice work in drawing. Location of farm buildings, drives, yards, etc., architectural designing, the study of plans, fittings and equipment; heating systems, ventilation, floors and wood work, painting and decorations.

7. **FARM STRUCTURES** PROFESSOR W. BOSS
 Three credits (three hours per week) First or second semester
 Open to juniors and seniors.
 The practical application of the principles outlined in course 3.
 Each student is required to lay out plans for an imaginary or real house, paying particular attention to location, sanitary conditions, heating, ventilating and general convenience.

FORESTRY

1. GENERAL FORESTRY ASSISTANT PROFESSOR DETWILER
 Three credits (three hours per week) First semester
 Open to freshmen.
 This course is intended to give the student an outline of the possibilities of forestry work and an idea of the forestry problems to be solved in this country. Considerable attention will be devoted to the sylvics of the trees suited to Minnesota climate; the establishment of nurseries; the planting and care of windbreaks and groves, especially on the prairies.
2. SYLVICS ASSISTANT PROFESSOR DETWILER
 Three credits First semester
 Open to juniors.
 The study of the fundamental principles which form the basis of silviculture, including the relation of forests to soil, climate and other factors which influence tree growth. Methods of silvical research, characteristics and habits of important trees. Lectures and collateral reading.
3. SYLVICULTURE ASSISTANT PROFESSOR DETWILER
 Four credits Second semester
 Open to juniors.
 Methods of crop production and reproduction; care and improvement of the forest; silvicultural practice in the United States and abroad. Special work in silvicultural studies and the making of forest descriptions. Lectures, assigned reading and field work.
4. FOREST PLANTING ASSISTANT PROFESSOR DETWILER
 One credit.
 Open to seniors. (In Itasca Park)
 Preparation of planting plans and notes on results of planting. Practical instruction in seed collecting, nursery practice, sowing and planting. Lectures and field work.
5. MENSURATION ASSISTANT PROFESSOR CHEYNEY
 Four credits
 Open to juniors. (In Itasca Park)
 Determination of the rate of growth and volume of single trees and of stands; construction of volume and yield tables. The measurement of logs and lumber. Compilation of statistics. Lectures, recitations and problems.
6. SURVEYING PROFESSOR STEWART
 Four credits
 Open to juniors. (In Itasca Park)
 Theory of land surveying and drill in the use and the care of the transit, level, plane table, etc. The student will be made familiar with approved methods of field work, particularly in running boundaries, topographic surveying and reconnaissance. Lectures and field work.
7. PROTECTION ASSISTANT PROFESSOR CHEYNEY
 Three credits First semester
 Open to juniors.
 Practical measures for the protection of forests against fire, insects, grazing, etc. Protection of water right and regulations of stream flow. Lectures and field work.
8. GAME PROTECTION AND FISH CULTURE
 One credit. Second semester
 Open to seniors (nine weeks)
 Habits, range, usefulness and manner of protecting the important large and small game, fish and birds of the United States.

9. FOREST MANAGEMENT ASSISTANT PROFESSOR CHEYNEY
Three credits First semester
Open to seniors.
This course includes forest valuation. The calculation of soil rent, forest rent and the value of growing stock; the values of even and uneven stands; the different methods of managing forest properties and the principles underlying them. Lectures, assigned reading and problems.
10. LUMBERING ASSISTANT PROFESSOR CHEYNEY
Three credits First semester
Open to seniors.
History of logging in the United States, together with the different methods used in the different forest regions; cruising, location of camps, building of roads, felling trees, skidding and transportation of the logs from the woods to the mill. The marketing and utilization are treated elsewhere. In connection with this course, the student is obliged to hand in a lumbering report based on data collected by him at some lumbering camp. This requires an excursion of about two weeks. Lectures and collateral reading.
11. FORESTS OF THE UNITED STATES AND WORLD ASSISTANT PROFESSOR DETWILER
One credit
Open to sophomores.
Closely follows forest physiography and metrology. Includes a brief description of the forests of the world including their distribution and chief characteristics. Detailed description of the forests of the United States with types and species of the different regions. Lectures and collateral reading.
12. LUMBER GRADING ASSISTANT PROFESSOR CHEYNEY
(Nine weeks) Second semester
Open to juniors.
The part which it plays in the lumber industry; methods and organization leading to uniformity. Study of the rules adopted by the Northern Pine Manufacturers' Association. Several excursions are made to the mills of Minneapolis to study grades and grading in the yards.
13. MAPPING PROFESSOR STEWART
Two credits
Open to seniors. (In Itasca Park)
Completion of a set of boundary, topographic, type, block and stand maps in connection with and based on data from working plans.
14. ADMINISTRATION ASSISTANT PROFESSOR DETWILER
One credit
Open to seniors. (In Itasca Park)
A study of the organizations necessary for the management of forest properties; federal, state, corporation and private.
15. FOREIGN FORESTRY PROFESSOR GREEN
One credit
Open to seniors. (In Itasca Park)
The development and present status of forestry in foreign civilized countries. Lectures.
16. SEMINARY ASSISTANT PROFESSORS CHEYNEY AND DETWILER
Three credits First semester
Open to seniors.
This is not, as the term generally implies, a class for the prosecution of original research work, but for the purpose of systematically reviewing the whole field of forestry and studying the concrete application of the different branches. Assigned questions and problems. Discussions.

17. **WORKING PLANS** ASSISTANT PROFESSOR CHEYNEY
 One credit
 Open to seniors. (In Itasca Park)
 This subject will be given in the woods. A course of lectures paralleling the field work will deal with the principles and methods involved. Each class will be obliged to work out a complete plan including surveys, silvicultural plans, estimating, yield tables, maps and systems of management. Lectures and field work.
18. **THINNING** ASSISTANT PROFESSOR DETWILER
 Four credits
 Open to juniors. (In Itasca Park)
 This course is designed to teach the student the principles underlying thinning operations and the tending of forests. Besides the class room work, there will be two months of field lectures and actual practice in marking. Lectures and field work.
19. **PACKING**
 Open to juniors. (In Itasca Park)
 Demonstration and practice under direction in the packing of wagons, boats, canoes, pack animals and pack sacks. Field lectures and practice.
20. **ROAD BUILDING** PROFESSOR STEWART
 Open to juniors. (In Itasca Park)
 Elementary principles of the science of road building. Rough field methods of laying out and constructing wood roads and trails; building bridges, etc. Lectures and field work.
21. **ESTIMATING TIMBER**
 Two credits
 Open to seniors (In Itasca Park)
 Duties of the cruiser, his methods, and the value of his results. Particular attention will be given to the best methods for use in a forest reconnaissance. Lectures and field practice.
22. **MARKET** ASSISTANT PROFESSOR CHEYNEY
 One credit
 Open to seniors (first nine weeks) Second semester
 General studies of the lumber market. Conditions of the market at present and methods which would tend to its betterment and greater stability in the future. The demands of the market and how they are supplied.
23. **SAW MILLS** ASSISTANT PROFESSOR CHEYNEY
 One credit
 Open to seniors (first nine weeks) Second semester
 Capital invested, machinery used, methods, cost of operation, and output of portable and stationary mills. Studies will be made of the modern mills of Minneapolis.
24. **FOREST ECONOMICS AND FOREST LAW** PROFESSOR GREEN
 One credit
 Open to sophomores.
 The development of forestry in the United States and European countries; the forest conditions here and abroad and their effect upon the lumber industry; forest policies of different governments. Laws in regard to contracts, water rights, roads, fences, legal papers. Legal measures for the prevention of trespass and fire. Text book, lectures and recitations.

FRENCH

1. **BEGINNING FRENCH** ASSISTANT PROFESSORS ANDRIST AND FRELIN,
 MADAM BERTIN
 Ten credits (five hours per week) Both semesters
 Open to all, but juniors and seniors receive only half credit; both semesters must be completed before credit is given for the first semester; not credited toward a minor in French.
 Fraser and Squair's *French Grammar and Reader*; modern texts.

2. INTERMEDIATE FRENCH

ASSISTANT PROFESSOR FRELIN AND

MADAM BERTIN

Both semesters

Six credits (three hours per week)

Open to sophomores, juniors and seniors who have completed course 1; both semesters must be completed before credit is given for the first semester.

François *Advanced French Prose Composition*; modern texts will be read, including some of the works of Coppée, Mérimée, Daudet, Scribe, etc.

GEOLOGY

1. GENERAL GEOLOGY

PROFESSOR HALL

Three credits (three hours per week)

First semester

Open to juniors and seniors.

Comprises: (1) geodynamics, in which are set forth the phenomena of the atmosphere, water, heat, gravity, and plants and animals as geologic agents; (2) structural geology, where-in stratification, displacement and veining of rock masses are described; (3) physiographic geology, pointing out prominent earth features and inquiring into the causes producing them; (4) an outline of historical geology. Conferences and lectures illustrated by photographs, maps, profiles, and lantern slides.

2. ESSENTIALS OF PHYSICAL GEOGRAPHY

ASSISTANT PROFESSOR LENHERTS

Three credits (three hours per week)

First semester

Open to juniors and seniors.

Discussion of the principles of earth sculpture and description of the structural features of continents, with special reference to the ethnic movements and commercial activities of mankind.

3. INDUSTRIAL GEOGRAPHY

ASSISTANT PROFESSOR LENHERTS

Three credits (three hours per week)

Second semester

Open to juniors and seniors who have completed course 1 or 2.

The structural features of the North American continent outlined as an introduction. Following this is a study of the types of soil and dominating climatic characters of the several agricultural regions of the continent; a discussion of the geography of industries as they have grown up within the past 100 years and their dependence upon physiographic conditions; a study of local industries effected through excursions and reports. A brief survey of industries in other parts of the world parallels the more detailed study of North America. Throughout the course cause and effect are kept in view.

4. ELEMENTS OF METEOROLOGY

ASSISTANT PROFESSOR LENHERTS

Three credits (three hours per week)

Second semester

Open to juniors and seniors who have completed course 1 or 2.

The general principles of meteorology are treated, embracing the properties and phenomena of the atmosphere, including an explanation of the ordinary observations of pressure and temperature, together with a more extended study of the apparatus and practice of a weather bureau office. This is followed by a study of storms and climatic elements generally. The conditions of climatic changes are studied and the influence of physiographic conditions are discussed. Text-book, lectures, and reference reading.

5. GEOGRAPHY AND GEOLOGY OF MINNESOTA

PROFESSOR HALL

Three credits (three hours per week)

Second semester

Open to juniors and seniors who have completed course 1.

(a) The physical geography of the state in its relations to geological history and industrial development. (b) A study of the principles and facts of pre-Cambrian geology as exemplified within the state and the extension of these into general application. (c) The present problems of the state in agriculture, drainage, water power, mining, quarrying, etc., are considered in some detail.

MINERALOGY

1. ELEMENTS OF MINERALOGY PROFESSOR HALL AND MR. GROUT
 Three credits (six hours per week) First semester
 Open to sophomores, juniors and seniors; the laboratory fee is three dollars.
 (a) The morphology of minerals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and of economic minerals; the basis of classification. (b) laboratory work; this consists of practice in the recognition of crystal forms, tests illustrating the range of minerals, and the application of chemical and blowpipe analysis to the identification of species.

GERMAN

1. BEGINNING PROFESSOR SCHLENKER, ASSISTANT PROFESSORS WILKIN AND JUERGENSEN, MR. BURKHARD, AND MR. WILLIAMS
 Ten credits (five hours per week) Both semesters
 Open to all, but juniors and seniors receive only half credit; both semesters must be completed before credit is given for the first semester.
 Pronunciation, grammar, conversation, and composition; selected reading in easy prose and verse.
2. INTERMEDIATE PROFESSOR SCHLENKER, MR. BURKHARD, AND MR. WILLIAMS
 Six credits (three hours per week) Both semesters
 Open to those who have completed course 1 or its equivalent; both semesters must be completed before credit is given for the first semester. This course may be supplemented by course 5. It should be followed by course 6 or course 7. Students who obtain credit for this course cannot receive credit also for either course 3 or course 4.
 First semester, selections from modern narrative and descriptive prose; selected lyrics and ballads. Second semester, a drama of Lessing, Goethe, or Schiller.
3. SCIENTIFIC INTERMEDIATE ASSISTANT PROFESSOR JUERGENSEN
 Six credits (three hours per week) Both semesters
 Open to all who have completed course 1; both semesters must be completed before credit is given for the first semester.
 First semester: *Hodge's German Science Reader* (or equivalent).
 Second semester: *Brandt and Day's German Scientific Reading*.
 This course aims to give the student a reading knowledge of German for use in scientific studies.

HORTICULTURE

1. FRUIT GROWING MR. CADY
 (Two hours) First semester
 Open to freshmen registered in division B.
 Geography of fruit growing, tilling, fertilizing and irrigation of lands; seed sowing; pollination; diseases and injurious insects and their prevention; storing, harvesting and marketing fruits. Lectures and text book.
2. VEGETABLE GARDENING MR. KOHLER
 (Three hours) half semester Second semester
 Open to freshmen registered in division B.
 Geography of vegetable growing, tilling, fertilizing and irrigation of lands; seed sowing; vegetables under glass; pollination; diseases and their prevention; storing, harvesting and marketing of vegetables. Lectures and text books.
3. PLANT PROPAGATION PROFESSOR GREEN AND MR. CADY
 Last nine weeks Second semester
 Open to freshmen registered in division B.
 Development of cultivated varieties of plants and seed testing; propagation of plants by seed, cutting, grafting and budding;

the work of the class room is illustrated by the orchards, nurseries, forest plantation, gardens and greenhouses on the grounds of the experiment station, and by visits to commercial nurseries and greenhouses nearby.

4. NURSERY WORK MR. CADY
 (Four hours per week) Second semester
 Open to sophomores.
 Seedage, layerage, cuttage, graftage, planting, pruning, thinning, storage of nursery stock; tillage of nursery lands; insects and diseases injurious to the nurseries and their prevention. Lectures and practice work.
5. GREENHOUSE MANAGEMENT AND FLORICULTURE PROFESSOR GREEN AND MR. CADY
 Three credits (elective)
 Open to juniors and seniors elective.
 Lectures and laboratory work. Greenhouse construction and management; temperature; soil; watering; benches; propagation; prevention of diseases and extermination of insects in greenhouses; rest and growth periods of plants; plants for greenhouse cultivation.
6. LANDSCAPE GARDENING PROFESSOR GREEN
 Three credits (elective), (given in 1908-9) Second semester
 Open to juniors and seniors elective.
 A general course in the practice and principles of landscape gardening, special attention being given to the planting of small grounds.
7. PLANT BREEDING PROFESSOR GREEN
 Three credits (elective), (given in 1909-10) Second semester
 Open to juniors and seniors elective.
 Lectures and laboratory work. The fact and philosophy of variation; crossing of plants and origination of domestic varieties.
8. SYSTEMATIC POMOLOGY MR. KOHLER
 Three credits (six hours per week) First semester
 Open to juniors and seniors elective.
 Description and classification of the varieties of the various fruits with special reference to those varieties adapted to Minnesota; the identification of varieties; judging of fruits; fruit sections of the country; and a brief study of the fruits not taken up in course 1 with their introduction, cultivation, propagation and distribution.

MATHEMATICS

1. SECOND PART HIGHER ALGEBRA MR. ROE
 (Three hours per week) First semester
 Open to freshmen registered in division A.
 For those not having an entrance credit in this subject.
2. SOLID GEOMETRY MR. ROE
 (Three hours per week) First semester
 For those not having an entrance credit.
3. PLANE TRIGONOMETRY MR. ROE
 (Three hours per week) half semester Second semester
 Open to sophomores.
 Functions of plane trigonometry, use of logarithm tables and numerous applications.
4. FARM ACCOUNTS MR. VYE
 Two credits, elective (four hours per week) Second semester
 Open to freshmen registered in division B.
 The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is taught to keep his accounts that he may know at any time the profit or

loss of any department of his business and is thus enabled to plan intelligently.
 Lectures are given on special features of farm business such as purchasing, selling, co-operation, banks, insurance, commercial, law and methods of obtaining accurate information concerning the farm.

PSYCHOLOGY

1. **INTRODUCTORY PSYCHOLOGY** PROFESSOR WILDE AND ASSISTANTS
 Three credits (three hours per week) First semester
 This course is required for all advanced work in Psychology and for the teacher's certificate; it also serves as an introduction to the courses in philosophy. The purpose of the course is to acquaint the student with the general characteristics and laws of mental life and with the aims and methods of modern psychology. The work involves text books, lectures and essays.
2. **EDUCATIONAL PSYCHOLOGY** ASSISTANT PROFESSOR MINER
 Three credits (three hours per week) Second semester
 Open only to sophomores, juniors and seniors who have completed course 1. The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.

PHYSICS

1. **AGRICULTURAL PHYSICS** PROFESSOR STEWART
 Three credits (six hours per week) Second semester
 Open to sophomores.
 This work is carried on by class demonstrations, reference work, discussions and note book records, a part of the work being done by the student in the laboratory.
 Among the questions treated are the molecular nature of matter, diffusion of liquids and gases, capillarity, etc.; the nature of force, specific gravity, the laws of motion, fluid pressure, weather forecasting, pumps, elevators, pulleys, the principles of draft in the horse, the various causes of draft in wagons and the fundamentals of electricity; rock-forming minerals, their physical properties and composition and their effect in the soil on texture and fertility; specific gravity determinations are made and pore-space calculated and tested and the bearings of these matters on productiveness are taken up.

RHETORIC

1. **RHETORIC** PROFESSOR LANSING
 Six credits (three hours per week) First and second semesters
 Open to all freshmen who have passed the entrance test in English. This course includes the study of formal rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.
2. **RHETORIC** PROFESSOR LANSING
 Six credits (three hours per week) First and second semesters
 Open to sophomores. The course consists of a study of the short story and of the essay and forms of public address. The writing of compositions and the keeping of a note book form a greater part of the work.

VETERINARY

1. **VETERINARY WORK** PROFESSOR REYNOLDS
 (Three hours per week) First semester
 Open to freshmen registered in division B.
 During the freshman year class B students take up a course of study in veterinary medicine, the purpose of which is to fit them for intelligent care of their farm stock. In this course the teaching is done by means of text book, lectures, reviews,

and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of stereopticon, charts, manikin of horse, skeletons and various other appliances. The work covers the following subjects elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases; examination for soundness; and a final short course on common medicines, studying their effects, uses and doses. At the hospital clinics, students are enabled to learn the elements of diagnosis for common diseases and forms of lameness.

2. ANATOMY PROFESSOR REYNOLDS
 One and a half credits (three hours per week) first nine weeks
 (elective) Second semester
 Open to juniors and seniors.
 Comparative anatomy of the digestive organs, dissection, collateral reading and recitation. Chauveau's *Comparative Anatomy* is used for reference and comparison.
3. BODY NUTRITION PROFESSOR REYNOLDS
 One and one half credits (three hours per week) nine weeks
 (elective) Second semester
 Open to juniors and seniors.
 This is an advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism. Veterinary Physiology, by F. Smith, is used as a text and guide for this work but students are required to do collateral reading.
4. ADVANCED ANATOMY PROFESSOR REYNOLDS
 One and one-half credits (six hours per week) first nine weeks
 (elective) Second semester
 Open to juniors and seniors.
 This course deals with the anatomy of locomotion. The bones, articulations and muscles involved in locomotion and conformation are studied by text book- dissection and collateral reading. Shoeing, diagnosis and treatment of common forms of lameness may be included in course 3. Strangeway's *Veterinary Anatomy* is used as a text book and Chauveau for reference.
5. COMMON DISEASES PROFESSOR REYNOLDS
 One and one-half credits (three hours per week) Second semester
 Open to juniors and seniors as an elective.
 This course covers causes, prevention, and deals with common and serious diseases of domestic animals.

ZOOLOGY

1. GENERAL ZOOLOGY PROFESSOR SIGERFOOS, ASSISTANT PROFESSOR
OESTLUND, BROWN, DOWNEY, AND MR. JOHNSON
 Six credits (six hours per week) Both semesters
 Open to all; the laboratory fee is three dollars per semester.
 This course is a comparative study of the principles of structure, physiology, and development in animals. In the laboratory a brief study of insects and the dissection of the frog are used as a practical introduction to the course. Then follow a study of cell structure and cell division, a systematic study of representatives of the chief phyla or branches of the animal kingdom, and a study of the elements of embryology as illustrated by the development of the star fish and chick. Lectures, quizzes, and laboratory work. Text-book required: Hertwig's *Manual of Zoology*.
2. MORPHOLOGY OF INVERTEBRATES PROFESSOR SIGERFOOS AND MR. JOHNSON
 Six credits (six hours per week) Both semesters
 Open to those who have completed course 1; both semesters must

be completed before credit is given for the first semester; the laboratory fee is three dollars per semester.

The object of this course is to familiarize the student with the methods and principles of zoology through an intensive study of two or three groups of animals and to acquaint him with the minor phyla not considered in course one. During the year 1908-9 the Protozoa and Crustacea will be the groups especially taken up.

3. ESSENTIALS OF HISTOLOGY AND EMBRYOLOGY PROFESSOR NACHTRIEB
AND ASSISTANT PROFESSOR DOWNEY

Six credits (six hours per week) Both semesters
Open to those who have completed course 1; the laboratory fee is three dollars per semester.

In this course are taken up the development and minute structure of the animal as an organism built up of tissues combined into organs, and the student is given practice in general methods, technique, and the use of apparatus. The course prepares directly for most of the advanced courses. Lectures, quizzes, and laboratory work.

4. COMPARATIVE ANATOMY OF VERTEBRATES ASSISTANT PROFESSOR BROWN
AND MR. JOHNSON

Six credits (six hours per week) Both semesters
Open to those who have completed course 1 or its equivalent; both semesters must be completed before credit is given for the first semester; the laboratory fee is three dollars per semester.

The first semester's work is based upon a study of chordates, cartilaginous and bony fishes and all classes up to mammalia; the second semester to a detailed study of the cat and comparative studies of the rabbit, sheep, and man. Lectures, quizzes, and laboratory work. Required text-books: Davidson's *Mammalian Anatomy* and *Burkholder's Anatomy of the Brain*.

5. GENERAL PHYSIOLOGY PROFESSOR NACHTRIEB

Six credits (three hours per week) Both semesters
Open to those who have completed course 1; both semesters must be completed before credit is given for the first semester.

In the first semester are considered the physical, structural, and functional features of living substance; the cell, present conditions, and expressions of life; and the theories of the origin of life and death. Demonstrations and simple experiments constitute an essential part of the course in both semesters.

In the second semester the life of the cell is considered in its relations to that of other cells and the course is concluded with special reference to the teaching of physiology in high schools.

Students

GRADUATE STUDENT—1.

Gaumnitz, Carl, St. Cloud.

SENIORS—7.

Ainslie, George G., Rochester.
Canavarrro, Georges de Souza,
Honolulu, Hawaii.
Cooper, Thomas P., Minneapolis.

Erwin, May, St. Anthony Park.
Hobart, Inez M., Minneapolis.
White, Hall B., Winnebago.
White, William, Camden, N. J.

JUNIORS—11.

Bergstrom, Chester H., Minneapolis.
*Bohn, Carl F., St. Paul.
Carroll, Harry B., Jr., St. Paul.
Hartzell, Mary K., Minneapolis.
Miller, Ralph C., Minneapolis,
Sta. F., R. 1.

Orr, George R., Michigan City, Ind.
Paterson, Thomas G., Wayzata.
Peterson, Elvin L., Olivia.
Underwood, Clarence, Hutchinson.
Ware, John F., St. Anthony Park.
West, Ralph L., Minneapolis.

SOPHOMORES—24.

Benson, Arnold O., Glenwood.
Benzin, Basil, Russia.
Berry, J. Bert, St. Paul.
Cleator, Fred W., Minneapolis.
Crandall, Leroy V., Red Wing.
Crimmins, Ellen May, Minneapolis.
Gaumnitz, Florence, St. Cloud, R 1.
Gore, John E., San Dimas, Cal.
Hohle, Ola Arnold, Hector.
Jacobson, Norman, Port
Washington, Wis.
Knowlton, Edith Viola, Minneapolis.
Krauch, Herman, St. Paul.

Laate, Gurid, St. Anthony Park.
Lathrop, Elbe A., Hugo.
Lewis, Charles L., Jr., St. Paul.
Marsden, Edith Viola, Edgerton, Wis.
Merrill, Alfred S., Minneapolis.
Pond, Harold H., Minneapolis,
Sta. F., R. 1.
Robb, George F., St. Paul.
Schrepel, Minnie A., LeSueur, R. 1.
Svarstad, Anne, Bath, So. Dak.
Underwood, William, Hutchinson.
Waller, Conrad J., St. Paul.
Potter, Alden A., Minneapolis.

FRESHMEN—74.

Alwin, LeRoy V., New Ulm.
Amy, Albert C., St. Paul Park.
Arrivee, David A., St. Paul.
Baker, George J., St. Paul.
Baker, Norman M., Davenport, Ia.
Bilsborrow, James D., Wolverton.
Blegen, Martha C., Minneapolis.
Brewster, Donald R., Minneapolis.
Bryan, William James,
Red Wing, R 2.
Bush, Clarence A., Minneapolis.
Christopherson, Edna H.,
Sioux Falls, S. D.
Coan, John R., Minneapolis.
Collin, William H., Northwood, Ia.
Donovan, Raymond L., Dundas.
Drew, Laurence, St. Paul.
Devorchek, Henry E., Glencoe.
Erickson, Richard I., Stillwater.
Evans, H. Vaughn, Tracy.
Falkenhagen, Jay F., Montevideo.
Forsman, John A., Duluth.
Fowler, Charles F., Minneapolis.
Gilbertson, Henry W., Jasper.
Gillis, James R., St. Anthony Park.
Glotfelter, Madge L., Minneapolis.
Hagerman, Wm. F., Morris.

Hamilton, Carl L., Minneapolis.
Hartzell, Dorothy, Minneapolis.
Hauge, Adolph G., Albert Lea.
Haw, John W., St. Anthony Park.
Hayford, Ruth, Minneapolis.
Hillman, Frank M., Minneapolis.
Hofmann, Julius V., Janesville.
Howard, Leola M., Rochester.
Johnson, Fred O., St. Anthony Park.
Keefe, Adeline M., Minneapolis.
Lane, Dwight J., Minnetonka, R 2.
Lemon, Lynn, St. Paul.
McElmeel, Stephen P., St. Paul.
Madden, Virginia A., St. Paul.
Matthews, Charles A., Ortonville.
Merrick, Kathleen, Minneapolis.
Merrill, Frederick B., Stillwater.
Miles, Lee O., West Concord.
Moore, Will A., Chatfield.
Morstad, Irene C. M.,
Sioux Falls, S. Dak.
Nash, Malcolm A., Tracy.
Noble, William E., Albert Lea.
Ohman, Enoch, Glenwood.
Older, Frank E., Luverne.
Parmalee, Alice B.,
Sioux Falls, S. Dak.

*Died March 6, 1908.

- Peters, Alfred G., Lake City, R 1.
Peterson, Joy R., St. Paul.
Peterson, Roy M., Olivia.
Poe, Richard, Cannon Falls.
Prosser, Eugene C., Minneapolis.
Robbins, Leon H., Clearwater.
Rowe, Bess M., Minneapolis.
Rust, Jay B., St. Paul.
Sargent, Forrest H., Red Wing, R 2.
Stanley, Ward A., Minneapolis.
Strong, Florence S., St. Paul.
Taylor, Deane C., St. Paul.
Thompson, Mark J., Winsted.
Tolaas, Arne C., St. Paul.
Uptegrafft, Leroy, St. Anthony Park.
Vafiadakis, Antony, Smyrna,
Asia Minor.
Vancura, Edward W., Lakefield.
Weber, Henry G., Minneapolis.
White, Frank B., Excelsior.
Wilke, Agnese, Minneapolis.
Williams, Donald T., Minneapolis.
Williams, Ruth J., St. Louis Park, R 1.
Wood, Robert A., Minneapolis.
Young, John Paul, St. Paul.



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